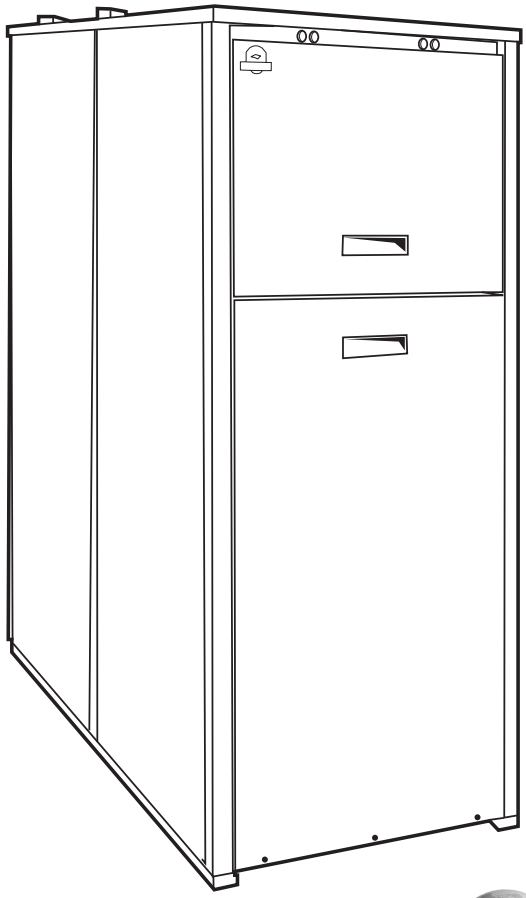
Carrier®

Product Data

AQUAZONE™
50PSW036-360
Water-to-Water
Water Source Heat Pump
with PURON® Refrigerant (R-410A)
50 Hz

8.6 to 68.2 Nominal kW

AQUAZONE™



ASHRAE 90.1 COMPLIANT

CE

Puron®
the environmentally sound refrigerant

Carrier's Aquazone water-to-water water source heat pumps (WSHPs) are designed for quality and high performance over years of operation.

- Performance rated according to ISO 13256-2 and ASHRAE 90.1
- Environmentally sound Puron refrigerant (R-410A)
- Provides both chilled and hot water
- Dual independent refrigerant circuits for 2-stage operation (sizes 120-360)
- High-efficiency scroll compressors
- Thermostatic expansion valve (TXV)
- Available mute package
- Standard low temperature insulation for extended range operation
- Service access through the front of the unit allows side-by-side installation for large capacity installations
- Flexible and reliable controls accomodate all systems
- CE Mark approval

Features/Benefits

Carrier's Aquazone WSHPs are a flexible, clean solution for tempering ventilation air or, in hydronic applications, as stand-alone boilers/chillers.

Premium performance

Aquazone units offer cooling EERs (Energy Efficiency Ratios) to 7.3 and heating COPs (Coefficients of Performance) to 5.3. Efficiencies are in accordance with standard conditions under ISO (International Organization for Standardization) Standard 13256-2 and exceed ASHRAE (American Society of Heating, Refrigerant and Air Conditioning Engineers) 90.1 Energy Standards.

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Features/Benefits (cont)

These units offer industry leading energy efficiency and environmental benefits by utilizing Carrier's Puron® refrigerant (R-410A) that eliminates all concerns of mandated refrigerant phase-out of R-22 (HCFC) in 2010. Each unit has been specifically designed for Puron refrigerant to provide years of optimum efficiencies with long life.

Puron® refrigerant (R-410A)

Puron refrigerant (R-410A) is a non-chlorine based refrigerant. Puron refrigerant characteristics, compared to R-22, are:

- Binary and near azeotropic mixture of 50% R-32 and 50% R-125.
- Higher efficiencies (50 to 60% higher operating pressures).
- Non-ozone depleting potential and low global warming potential.
- Virtually no glide. Unlike other alternative refrigerants, the two components in Puron refrigerant have virtually the same leak rates. Therefore, refrigerant can be added if necessary without recovering the charge.

High quality construction and testing

All units are manufactured to meet extensive quality control protocol from start to finish through an automated control system, which provides continuous monitoring of each unit and performs quality control checks as equipment progresses through the production process. Standard construction features of the Aquazone™ units include:

Cabinet — Standard cabinet construction consists of heavy gage galvanized sheet metal that provides maximum strength. Cabinet interior surfaces are lined with 13 mm thick, 28 kg/m^3 acoustic type insulation. All exterior sheet metal surfaces are powder-painted to increase corrosion protection and resilience for long term vitality. Cabinets are designed with service access panels on the front for easy accessibility.

Compressors — Standard high-efficiency scroll compressors are mounted on rubber grommets to large, heavy gage mounting tray plates, which are then isolated from the cabinet base with rubber grommets. This dual level vibration isolation system dramatically increases vibration attenuation.

Refrigeration/water circuit — Units have two sealed refrigerant circuits including scroll compressors. Refrigerant circuits are provided with standard thermostatic expansion valves (TXVs) for higher accuracy and performance. Also standard are a reversing valve (4-way valve) and load and source water-to-refrigerant coaxial (tube in tube) coils.

Quality assurance — Aquazone units have NRTL (Nationally Recognized Testing Lab) or ETL labels and are factory tested under normal operating conditions at nominal water flow rates. Quality assurance is provided via testing report cards shipped with each unit to indicate specific unit performance under cooling and heating modes of operation.

Quiet operation

Rubber grommets are provided for sound isolation and cabinets are fully insulated to reduce noise transmission.

Design flexibility

Units have an entering source water temperature range from –5 to 45 C (40 C for sizes 180 and 360) and entering (heating) load water temperature range from 15 to 50 C or entering (cooling) load water temperature range of 10 to 30 C as standard.

Safe, reliable operation

Standard safety features for the refrigerant circuit include a high-pressure switch and low-pressure sensor to detect loss of refrigerant. Equipment safety features include water loop temperature monitoring, voltage protection, and source freeze protection. All safety features are tested and run at the factory to assure proper operation of all components and safety switches.

All components are carefully designed and selected for endurance, durability, and carefree, day-to-day operation.

The unit is shipped to provide internal and external equipment protection. Shipping supports are placed under the compressor feet.

Ease of installation

The unit is packaged for simple low cost handling, with minimal time required for installation. All units are pre-wired and factory charged with refrigerant. Water connections (FPT), high and low voltage knockouts, and an easily accessible design reduce installation time and save mechanical room space.

Simple maintenance and serviceability

For better flexibility in confined spaces, access for maintenance and service is provided from three sides of the unit. Large access panels on the top, side, and front of the unit maximize exposure for all components. Easy removal of the control box from the unit provides access to all refrigeration components. The refrigeration circuit is easily tested and serviced through the use of high and low pressure ports integral to the refrigeration circuit. All maintenance and service can be completed through the front of the unit, allowing

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multiple units to be installed side-by-side.

Maximum control flexibility

Aquazone™ water source heat pumps provide reliable control operation using a standard microprocessor board with flexible alternatives for many direct digital control (DDC) applications including the Carrier Comfort Network® (CCN) and open protocol systems.

Carrier's Aquazone standard unit solid-state control system, the Complete C control, provides control of the unit compressor, reversing valve, fan, safety features, and troubleshooting fault indication features. The Complete C control is one of the most user friendly, low cost, and advanced control boards found in the WSHP industry. Many features are field selectable to provide the ultimate in field installation flexibility. The overall features of this standard control system include:

Transformer (75 va) — The transformer assists in accommodating accessory loads with a load side short circuit and overload protection via a built-in circuit breaker.

Anti-short cycle timer — The timer provides a minimum off time to prevent the unit from short cycling. The 5-minute timer energizes when the compressor is deenergized, resulting in a 5-minute delay before the unit can be restarted.

Random start relay — The relay ensures a random delay in energizing each different WSHP unit. This option minimizes peak electrical demand during start-up from different operating modes or after building power outages.

High and low pressure refrigerant protection — Refrigerant protection safeguards against unreliable unit operation and helps prevent refrigerant from leaking.

High and low voltage protection — Voltage safety protection guards against excessive or low voltage conditions.

Automatic intelligent reset — The unit automatically restarts 5 minutes after shutdown if the fault has cleared. Should a fault occur 3 times sequentially, then lockout will occur.

Accessory output — A 24-v output is provided to cycle a motorized water valve, damper actuator, etc. with compressor for applications such as variable speed and primary secondary pumping arrangements.

Performance Monitor (PM) — This unique feature monitors water temperatures and warns when the heat pump is operating inefficiently or beyond typical operating range. Field selectable switch initiates a warning code on the unit display.

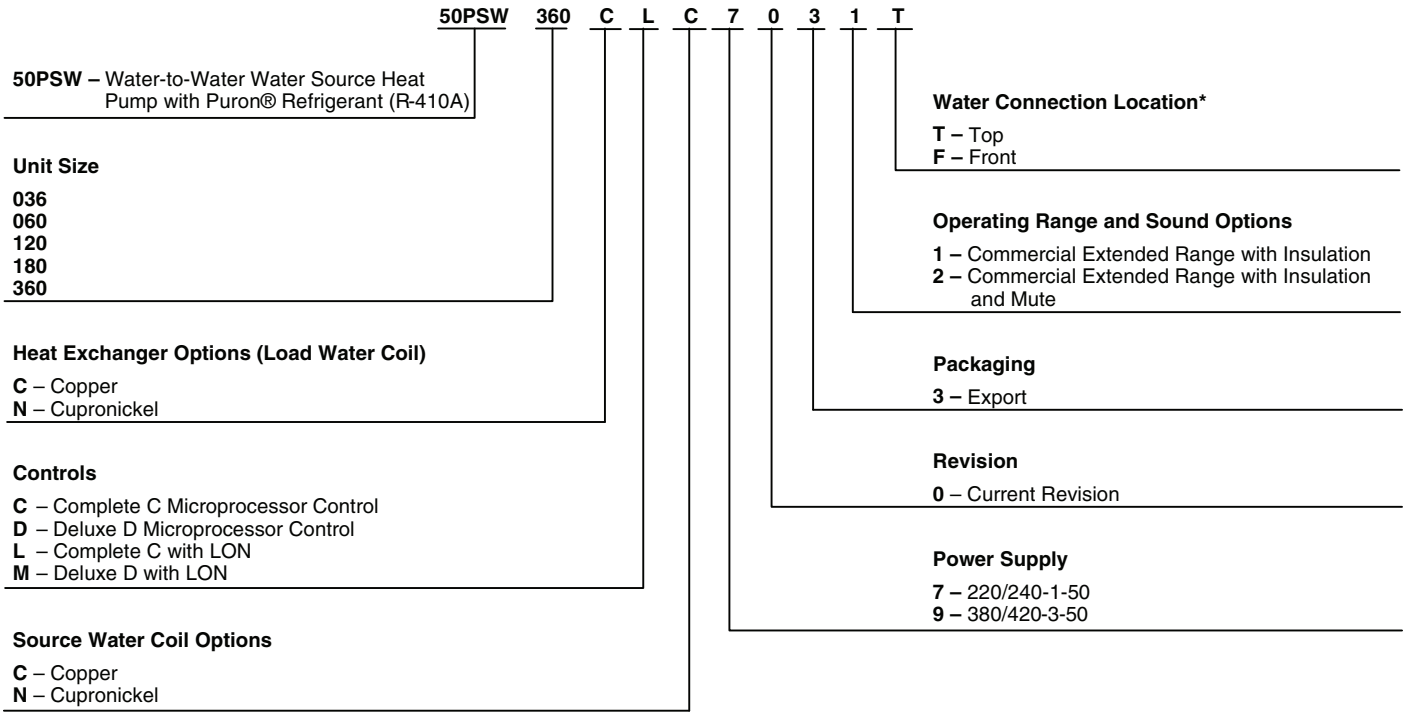
Source freeze protection (selectable for water or antifreeze) — This field-selectable switch for water and water/glycol solution systems initiates a fault when temperatures exceed the selected limit for 30 continuous seconds.

Alarm relay setting — A selectable 24-v or pilot duty dry contact provides activation of a remote alarm.

Service test mode with diagnostic LED (light-emitting diode) — The Test mode allows service personnel to check the operation of the WSHP and control system efficiently. Upon entering Test mode, time delays are sped up and the Status LED will flash a code to indicate the last fault experienced for easy diagnosis. Based on the fault code flashed by the status LED, system diagnostics are assisted through the use of Carrier-provided troubleshooting tables for easy reference to typical problems.

LED visual output — An LED panel indicates high pressure, low pressure, low voltage, high voltage, air/water freeze protection, condensate overflow, and control voltage status.

Model number nomenclature



LEGEND

LON — LonWorks† Interface System

*Load/source water connections are located on the front of the unit for sizes 036-120. Water connections are located on the top of the unit for sizes 180 and 360.

†Registered trademark of Echelon Corporation.

AHRI/ISO/ASHRAE capacity ratings

50PSW UNIT SIZE	WATER LOOP HEAT PUMP				GROUND WATER HEAT PUMP				GROUND LOOP HEAT PUMP			
	Cooling		Heating		Cooling		Heating		Cooling		Heating	
	Indoor EWT 12 C Outdoor EWT 30 C		Indoor EWT 40 C Outdoor EWT 20 C		Indoor EWT 12 C Outdoor EWT 15 C		Indoor EWT 40 C Outdoor EWT 10 C		Indoor EWT 12 C Outdoor EWT 25 C		Indoor EWT 40 C Outdoor EWT 0 C	
	Capacity (kW)	EER	Capacity (kW)	COP	Capacity (kW)	EER	Capacity (kW)	COP	Capacity (kW)	EER	Capacity (kW)	COP
036	8.64	4.64	11.32	5.20	9.71	7.31	9.28	4.27	8.91	5.32	7.14	3.27
060	14.39	4.87	19.37	5.30	15.50	7.18	16.00	4.30	15.12	5.89	12.81	3.40
120	28.78	4.87	38.75	5.30	31.01	7.18	32.01	4.30	30.25	5.89	25.62	3.40
180	34.13	4.30	45.92	5.00	37.28	6.41	36.71	4.08	36.82	4.99	28.89	3.18
360	68.23	4.30	91.56	5.00	78.45	6.38	73.15	3.97	73.81	4.99	57.34	3.18

LEGEND

COP — Coefficient of Performance
EER — Energy Efficiency Ratio
EWT — Entering Water Temperature

NOTES:
1. Rated in accordance with AHRI (Air Conditioning, Heating, and Refrigeration Institute, U.S.A.) and ISO (International Organization of Standardization) Standard 13256-2 and ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) Energy Standard 90.1 programs.
2. Cooling capacities based upon 27 C DB, 19 C WB entering air temperature. Heating capacities based upon 20 C DB, 15 C WB entering air temperature.
3. Ground lop heat pump ratings based on 15% methanol antifreeze solution.
4. All ratings based upon operation at lower voltage of dual voltage rated models.

Physical data

50PSW UNIT SIZE	036	060	120	180	360
NOMINAL CAPACITY (kW)	10.5	17.6	35.2	49.2	105.5
WEIGHT (kg)					
Operating	158	163	329	358	604
Packaged	169	175	349	363	608
COMPRESSOR (qty)	Scroll (1)	Scroll (1)	Scroll (2)	Scroll (1)	Scroll (2)
REFRIGERANT TYPE			R-410A		
Factory Charge Per Circuit (kg)	2.04	2.83	2.83	6.80	6.80
CONNECTIONS, FPT (in.)					
Commercial Load/Source	3/4	1	1 1/2	2	2
WATER VOLUME (L)	3.64	5.04	10.02	13.27	25.44

NOTES:
1. Maximum working pressure on the base unit is 3445 kPa.
2. Units have a dual isolated compressor mounting.
3. Units have a balanced port expansion valve (TXV).
4. Insulated source and load water coils are standard.
5. Insulated refrigerant circuit is standard.
6. Compressor is on (green) light and fault on (red) light.

Options and accessories

DESCRIPTION	FACTORY-INSTALLED OPTIONS	FIELD-INSTALLED ACCESSORIES
Mute Package (Sound Attenuation)	X	
Heat Exchanger Options	X	
Deluxe D Control System	X	
LonWorks Interface System	X	
Aquazone™ Thermostats		X
Remote Sensors		X
Fire-Rated Hose		X
Ball Valves		X
Y Strainers		X
Solenoid Valves		X
Hose Kit Assemblies		X

Factory-installed options

Mute package (sound attenuation) is available for applications that require especially low noise levels. With this option, a double application of sound attenuating material is applied. The mute package, in combination with standard unit noise reduction features, provides high levels of noise reduction.

Heat exchanger options are available for both the load and source coaxial heat exchangers. The load and source heat exchangers are available in cupronickel as an option.

Deluxe D control system provides the same functions as the standard Complete C control while incorporating additional functions to include:

Thermostat accommodates emergency shutdown mode and night setback with override (NSB) potential. Night setback from low temperature thermostat with 2-hour override is initiated by a momentary signal from the thermostat.

Compressor relay staging is used with dual stage units (units with 2 compressors and 2 Deluxe D controls) or in master/slave applications.

Boilerless electric heat control system allows automatic changeover to electric heat at low loop water temperature.

Intelligent reversing valve operation minimizes reversing valve operation for extended life and quiet operation.

Thermostat type select (Y, O or Y, W) provides ability to work and select heat pump (Y, O) or heat/cool thermostats (Y, W).

Reversing valve signal select (O or B) provides selection for heat pump O or B thermostats.

Dehumidistat input provides operation of fan control for dehumidification operation.

Multiple units on one thermostat/wall sensor provides for communication for up to three heat pumps on one thermostat.

Boilerless changeover temperature provides selection of boilerless changeover temperature set point.

Accessory relays allow configuration for multiple applications including fan and compressor cycling, digital night setback (NSB), mechanical night setback, water valve operation, and outside air damper operation.

Transformer (75 va) assists in accommodating accessory loads with a load side short circuit and overload protection via a built-in circuit breaker.

LonWorks interface system provides the same features as chosen control system (Complete C or Deluxe D). The chosen control board shall be supplied with a LonWorks interface board, which is LONMark* certified. This will permit all units to be daisy chained via a 2-wire twisted pair shielded cable. This interface system provides the following information and command abilities at a central or remote computer location:

- Source leaving water temperature
- Load leaving water temperature
- Command of space temperature set point
- Cooling status
- Heating status
- Low temperature sensor alarm
- Low pressure sensor alarm
- High pressure sensor alarm
- Condensate sensor alarm
- High/low voltage alarm
- Unoccupied/occupied command
- Cooling command
- Heating command
- Fault reset command
- Itemized fault code revealing reason for specific shutdown fault (any one of 7)

Transformer (75 va) assists in accommodating accessory loads with a load side short circuit and overload protection via a built-in circuit breaker.

Field-installed accessories

Carrier's line of Aquazone thermostats are both attractive and multi-functional, accommodating stand-alone water source heat pump installations.

Programmable 7-day thermostat offers 2-stage heat, 2-stage cool, auto changeover, 7-day programmable with copy command, 4 settings per day, fully electronic, 24 vac, backlit LCD, keypad lockout, no batteries required, 5-minute compressor protection, NEVERLOST™ memory, 3 security levels, and temperature display in degrees F or C.

Programmable 7-day light-activated thermostat offers the same features as the 7-day programmable thermostat plus occupied comfort settings with lights on and unoccupied energy savings with lights off.

Programmable 7-day flush-mount thermostat offers the same features as the 7-day programmable thermostat and includes locking coverplate with tamper proof screws, flush to wall mount, holiday/vacation programming, set point limiting, dual point with adjustable deadband, O or B terminal, and optional wall or duct mounted remote sensor.

Programmable 5-day thermostat offers 2-stage heat, 2-stage cool, auto changeover, 5-minute built-in compressor protection, and includes locking cover, temperature display in degrees F or C, keypad lockout, backlit display, 5-1-1 programming, O or B terminal, dual set point with adjustable deadband, configurable display, and self-prompting program with 4 settings per day.

Non-programmable thermostat offers 2 heat stages, 2 cool stages, auto changeover, and 5-minute built in compressor protection, and includes locking cover, temperature display in degrees F or C, keypad lockout, large display, back-lit display, O or B terminal, dual set point with adjustable deadband, and backplate with terminals.

Remote sensors are available for Aquazone flush-mount thermostats and for wall (wired and wireless) or duct mounted applications.

Fire-rated hose is 61 cm long and has a fixed MPT on one end and a swivel with an adapter on the other end. Hose kits are provided with both a supply and return hose and can be either stainless steel or galvanized. Five sizes are available ($1/2$, $3/4$, 1, $1\,1/4$, $1\,1/2$ in.).

NOTE: Hose kit connections are English sizes to match unit connections. Metric equivalents are 12.7, 19.0, 25.9, 31.8, and 38.1 mm.

Ball valves (brass body) are used for shut off and balancing water flow. Valves are available with memory, memory stop, and pressure temperature ports. Valves are ball and stem type with Teflon† seats and seals and a UL-listed brass body. Five sizes are available ($1/2$, $3/4$, 1, $1\,1/4$, $1\,1/2$ in.).

NOTE: Brass valve connections are English sizes to match unit connections. Metric equivalents are 12.7, 19.0, 25.9, 31.8, and 38.1 mm.

Y strainers (bronze body) are "Y" type strainers with a brass cap and a maximum operating pressure rating of 3103 kPa. The strainer screen is made of stainless steel. Strainers are available with blow down valves. Four sizes are available ($3/4$, 1, $1\,1/4$, $1\,1/2$ in.).

NOTE: Strainer connections are English sizes to match unit connections. Metric equivalents are 19.0, 25.9, 31.8, and 38.1 mm.

Solenoid valves (brass body) offer 3.5 watt coil, 24-v, 50/60 Hz, 740 amps inrush, and .312 amps holding. Slow operation of valves means quiet system application. Four sizes are available ($3/4$, 1, $1\,1/4$, $1\,1/2$ in.).

NOTE: Valve connections are English sizes to match unit connections. Metric equivalents are 19.0, 25.9, 31.8, and 38.1 mm.

Hose kit assemblies provide all the necessary components to hook up a water-side system. All hose assemblies have the valves already assembled to the hose and, depending on job requirements, can be installed in three different arrangements:

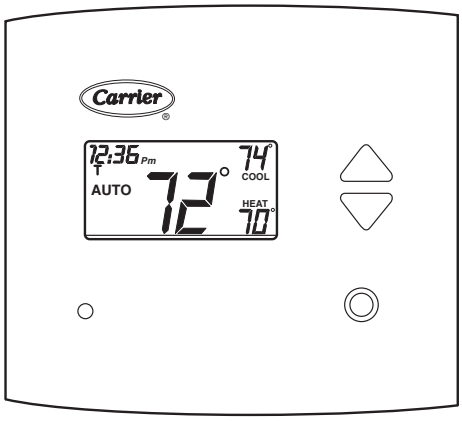
SUPPLY HOSE	RETURN HOSE
Ball valve and PT port	Ball valve and PT port
Ball valve and PT port	Automatic flow regulator valve with PT ports and ball valve
"Y" Strainer with blowdown valve and ball valve and PT port	Automatic flow regulator valve with PT ports and ball valve

PT — Pressure Temperature

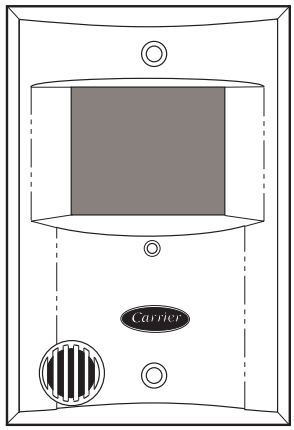
*Registered trademark of Echelon Corporation.
†Teflon is a trademark of E.I. du Pont de Nemours and Company.

Options and accessories (cont)

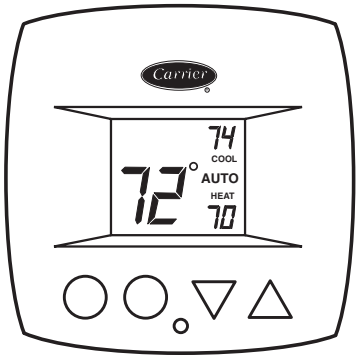
CARRIER AQUAZONE™ THERMOSTATS



7-DAY PROGRAMMABLE/LIGHT-ACTIVATED PROGRAMMABLE



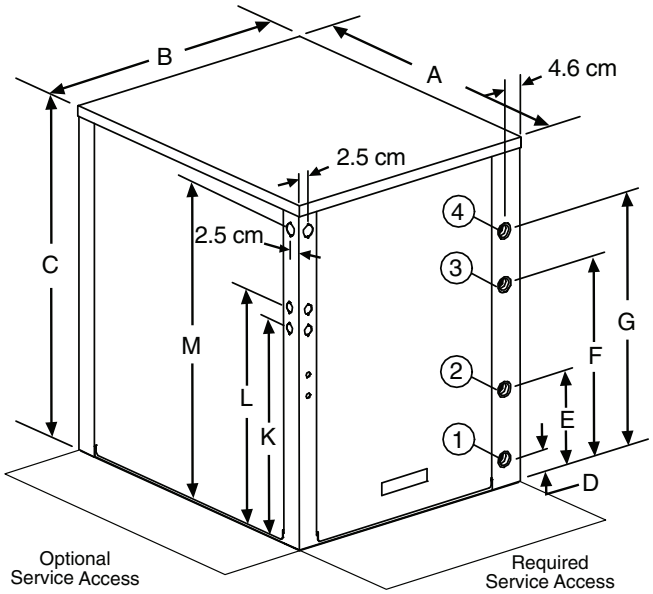
7-DAY PROGRAMMABLE FLUSH MOUNT



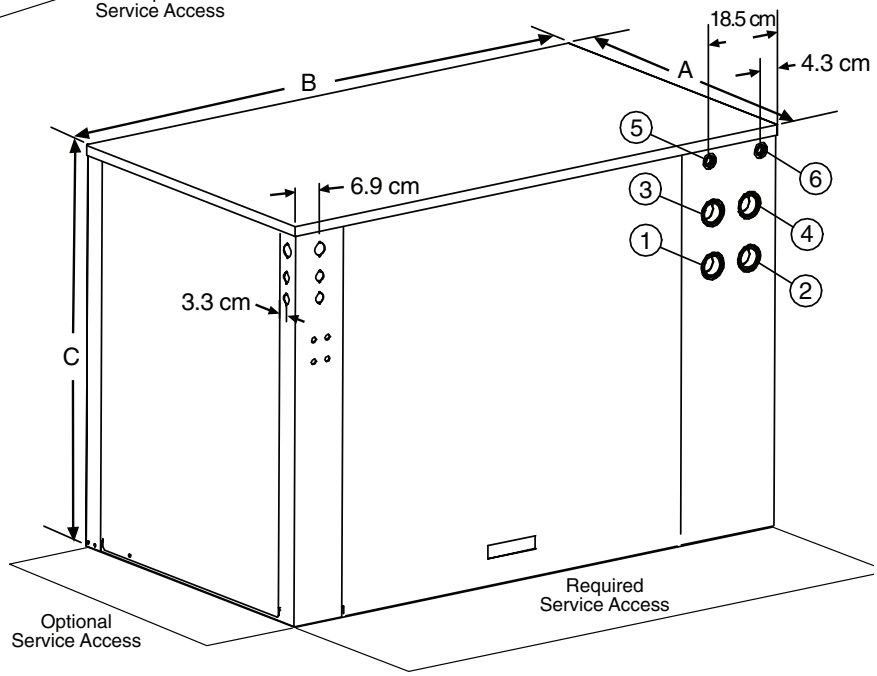
5-DAY PROGRAMMABLE/NON-PROGRAMMABLE

Dimensions

50PSW036-120 UNIT



SIZE 036,060



SIZE 120

50PSW UNIT SIZE	OVERALL CABINET (mm)			WATER CONNECTIONS (mm)				ELECTRIC ACCESS PLUGS (mm)		
				1	2	3	4			
				Source (Outdoor)		Load (Indoor)				
	A Depth	B Width	C Height	D Water In	E Water Out	F Water In	G Water Out	K Low Voltage	L External Pump	M Power Supply
036,060	778	645	838	69	239	493	622	531	582	785
120	778	1344	940	640	640	765	765	759	810	874

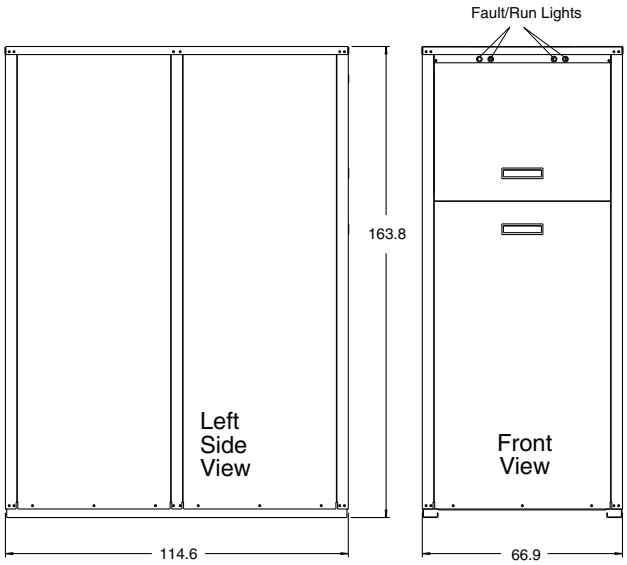
LEGEND

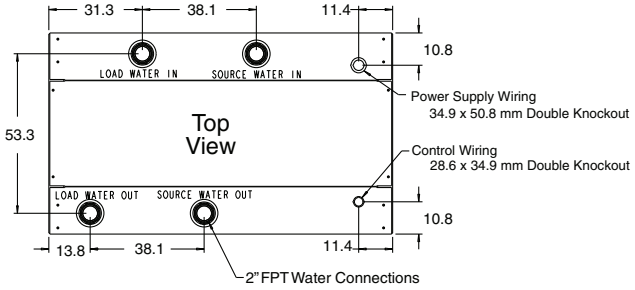
HACR — Heating, Air Conditioning, and Refrigeration

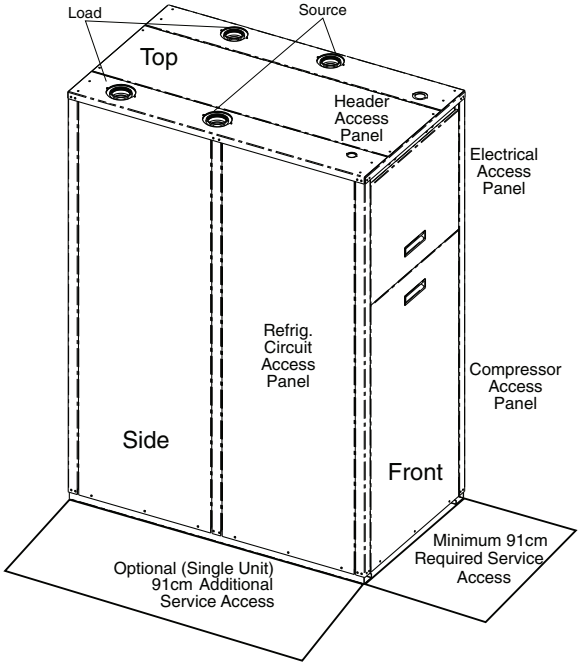
NOTES:
1. Dimensions shown in centimeters unless noted otherwise.
2. HACR circuit breaker in U.S.A. only.

Dimensions (cont)

50PSW180,360 UNIT







LEGEND
FPT — Female Pipe Thread

NOTES:
1. Dimensions shown in centimeters unless noted otherwise.
2. For multiple units placed side by side, allow 1.2 m minimum front access for service and maintenance.

Selection procedure (with 50PSW360 example)

I Determine the unit application designation for the source and load heat exchangers.

Source Coil . . . . . Boiler/Tower Loop
Load Coil . . . . . Air-Handling Unit

NOTE: The source could be an earth loop, well water, process water, condenser water, etc.

NOTE: The load could be a water coil in an air-handling unit(s), fan coil(s), hydronic baseboard, in-slab piping, swimming pool, etc.

II Determine the actual cooling and heating load requirements required for the application.

The load requirements will be the necessary heating and/or cooling required by the load of the 50PSW unit.

Total Load Heating . . . . . 78 kW
Total Load Cooling . . . . . 72 kW

NOTE: In this example, the load requirements represent the air-handling unit cooling and heating loads.

III Determine the following design parameters.

The design conditions for the source and load coaxial heat exchangers need to be identified to closely match the load heat exchanger requirements.

Enter the 50PSW360 heating table with the following parameters:

Source Coil:

Entering Water Temperature . . . . . 15 C
Water Flow. . . . . 3.34 L/s
Water Pressure Drop . . . . . 23.9 kPa

Load Coil:

Entering Water Temperature . . . . . 35 C
Water Flow. . . . . 3.34 L/s
Water Pressure Drop . . . . . 20.4 kPa

Enter the 50PSW360 cooling table with the following parameters:

Source Coil:

Entering Water Temperature . . . . . 40 C
Water Flow. . . . . 3.34 L/s
Water Pressure Drop . . . . . 19.5 kPa

Load Coil:

Entering Water Temperature . . . . . 20 C
Water Flow. . . . . 3.34 L/s
Water Pressure Drop . . . . . 22.9 kPa

NOTE: The source entering water temperature can be –7 C to 44 C. The load entering water temperature can be 10 C to 49 C. Also, water flow can be as low as 2.2 L/s per kW for constant temperature liquid (e.g., well water) or as high as 4.4 L/s per kW for variable liquid temperature.

IV Evaluate a unit based on total cooling and heating conditions. Unit selected should be closest to the actual loads.

At the conditions identified, the unit heating and cooling performance is read on the heating and cooling performance tables for a 50PSW360 unit.

Total Capacity — Heating . . . . . .78.8 kW
Total Capacity — Cooling . . . . . .72.1 kW

NOTE: Interpolation is permissible if the design criteria are not identified in the tables.

V Evaluate the leaving water temperature.

The leaving water temperature should be appropriate for the application (e.g., chilled water or hot water for tempering ventilation air). If the leaving load water temperature is above freezing, freeze protection (e.g., glycol/water solution) is not required.

Leaving Water Temp (Cooling) . . . . . 14.8 C
Leaving Water Temp (Heating) . . . . . 40.6 C

NOTES:

1. **Selecting multiple units to accomplish a heating and/or cooling load by piping the load heat exchanger sides in parallel flow:**

   If design heating and/or cooling loads for the load heat exchanger cannot be accomplished with a single 50PSW unit, the same selection procedure can be utilized to add multiple units. The capacities of two units can be added together when piped in parallel. Refer to the Application Data section for details on parallel operation.

2. **Selecting multiple units to accomplish a lower cooling leaving water temperature than can be accomplished by one 50PSW unit:**

   If design leaving water temperature from the load heat exchanger for cooling cannot be accomplished with a single 50PSW unit, the same selection procedure can be utilized to add multiple units. The leaving water temperature can be further lowered for multiple units when piped in series. Refer to the Application Data section for details on series operation.

Performance data

COOLING CAPACITIES
50PSW036

SOURCE			LOAD																			
	Flow		Flow 0.28 l/s							Flow 0.43 l/s							Flow 0.57 l/s					
EWT C	l/s	kPa	EWT C	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa
10	0.28	8.6	10	8.54	1.22	7.32	2.00	6.99	4.1	9.07	1.25	7.82	4.33	7.28	9.7	9.07	1.18	7.89	5.61	7.68	9.7
			15	9.57	1.25	8.31	6.00	7.63	3.4	9.99	1.26	8.73	8.72	7.91	9.0	9.99	1.23	8.76	10.22	8.12	9.7
			20	10.20	1.23	8.97	10.22	8.29	3.4	10.78	1.28	9.50	13.28	8.43	9.0	10.78	1.30	9.48	14.83	8.32	9.0
			25	11.15	1.28	9.87	14.56	8.71	2.8	11.41	1.29	10.12	17.83	8.86	8.3	11.41	1.31	10.10	19.56	8.70	8.3
			30	11.65	1.30	10.35	19.06	8.99	2.8	11.94	1.30	10.63	22.50	9.15	8.3	11.94	1.31	10.62	24.33	9.10	8.3
	0.43	22.4	10	10.78	1.23	9.55	1.89	8.76	4.1	9.18	1.18	7.99	4.28	7.77	9.7	9.18	1.15	8.03	5.56	7.99	9.7
			15	9.70	1.19	8.51	5.89	8.16	3.4	10.12	1.20	8.92	8.67	8.45	9.0	10.12	1.22	8.90	10.17	8.28	9.7
			20	10.57	1.21	9.36	10.06	8.77	3.4	10.91	1.21	9.70	13.17	8.99	9.0	10.91	1.23	9.68	14.78	8.87	9.0
			25	11.28	1.21	10.06	14.39	9.29	2.8	11.57	1.22	10.35	17.72	9.47	8.3	11.57	1.23	10.34	19.50	9.40	8.3
			30	11.80	1.23	10.57	18.89	9.60	2.8	11.78	1.23	10.55	19.28	9.58	8.3	11.78	1.23	10.55	21.06	9.58	8.3
	0.57	39.5	10	8.75	1.09	7.66	1.78	8.03	4.1	9.31	1.11	8.20	4.17	8.41	9.7	9.31	1.15	8.16	5.50	8.11	9.7
			15	9.81	1.12	8.69	5.78	8.79	3.4	10.25	1.12	9.13	8.56	9.13	9.0	10.25	1.15	9.10	10.11	8.93	9.7
			20	10.73	1.13	9.59	9.94	9.48	3.4	11.04	1.14	9.90	13.06	9.69	9.0	11.04	1.15	9.89	14.72	9.62	9.0
			25	11.44	1.14	10.30	14.28	10.03	2.8	11.73	1.15	10.58	17.67	10.21	8.3	11.73	1.15	10.58	19.39	10.21	8.3
			30	11.96	1.16	10.81	18.78	10.35	2.8	11.94	1.16	10.78	19.22	10.32	8.3	11.94	1.15	10.79	21.00	10.40	8.3
20	0.28	6.6	10	7.97	1.57	6.40	2.50	5.09	4.1	8.49	1.57	6.93	4.67	5.42	9.7	8.49	1.60	6.89	5.89	5.31	9.7
			15	8.94	1.58	7.36	6.61	5.65	3.4	9.75	1.57	8.18	8.89	6.20	9.0	9.75	1.60	8.15	10.50	6.10	9.7
			20	10.04	1.61	8.44	10.56	6.25	3.4	10.75	1.58	9.17	13.28	6.79	9.0	10.75	1.61	9.15	15.11	6.69	9.0
			25	10.96	1.62	9.34	14.72	6.75	2.8	11.62	1.61	10.01	17.72	7.23	8.3	11.62	1.61	10.01	19.78	7.23	8.3
			30	11.78	1.64	10.14	18.94	7.18	2.8	11.94	1.62	10.32	19.50	7.39	8.3	11.94	1.61	10.33	21.67	7.43	8.3
	0.43	18.5	10	8.07	1.49	6.58	2.44	5.41	4.1	8.60	1.48	7.11	4.61	5.79	9.7	8.60	1.52	7.08	5.83	5.67	9.7
			15	9.07	1.50	7.57	6.50	6.04	3.4	9.88	1.49	8.39	8.78	6.62	9.0	9.88	1.53	8.36	10.44	6.48	9.7
			20	10.17	1.52	8.66	10.44	6.71	3.4	10.91	1.51	9.40	13.17	7.23	9.0	10.91	1.53	9.38	15.06	7.15	9.0
			25	11.09	1.54	9.55	14.56	7.20	2.8	11.78	1.53	10.25	17.67	7.72	8.3	11.78	1.53	10.25	19.72	7.72	8.3
			30	11.94	1.56	10.38	18.83	7.66	2.8	12.07	1.53	10.53	19.11	7.87	8.3	12.07	1.53	10.54	21.28	7.91	8.3
	0.57	34.1	10	8.18	1.39	6.78	2.33	5.87	4.1	8.70	1.39	7.31	4.50	6.24	9.7	8.70	1.44	7.26	5.78	6.03	9.7
			15	9.18	1.41	7.76	6.39	6.51	3.4	10.02	1.40	8.61	8.72	7.14	9.0	10.02	1.38	8.64	10.39	7.27	9.7
			20	10.31	1.43	8.88	10.33	7.22	3.4	11.04	1.42	9.62	13.11	7.78	9.0	11.04	1.43	9.61	15.00	7.74	9.0
			25	11.23	1.44	9.78	14.44	7.78	2.8	11.94	1.44	10.50	17.56	8.32	8.3	11.94	1.44	10.49	19.67	8.27	8.3
			30	12.07	1.46	10.61	18.67	8.27	2.8	12.22	1.44	10.79	19.00	8.52	8.3	12.22	1.44	10.78	21.22	8.47	8.3
30	0.28	5.3	10	7.26	1.99	5.26	3.17	3.64	4.1	7.76	2.02	5.74	5.11	3.84	9.7	7.76	2.03	5.72	6.28	3.81	9.7
			15	8.23	2.02	6.21	7.28	4.08	3.4	8.99	2.03	6.97	9.39	4.44	9.0	8.99	2.03	6.96	10.83	4.42	9.7
			20	9.39	2.03	7.35	11.17	4.62	3.4	10.12	2.04	8.08	13.67	4.96	9.0	10.12	2.03	8.09	15.39	4.98	9.0
			25	10.44	2.05	8.39	15.22	5.09	2.8	11.09	2.06	9.04	18.06	5.39	8.3	11.09	2.03	9.06	20.00	5.46	8.3
			30	11.33	2.06	9.27	19.39	5.51	2.8	11.41	2.07	9.34	19.50	5.52	8.3	11.41	2.03	9.38	21.56	5.61	8.3
	0.43	16.5	10	7.33	1.89	5.44	3.11	3.87	4.1	7.86	1.92	5.94	5.06	4.10	9.7	7.86	1.89	5.97	6.22	4.17	9.7
			15	8.33	1.91	6.42	7.17	4.36	3.4	9.10	1.92	7.18	9.28	4.74	9.0	9.10	1.89	7.21	10.78	4.82	9.7
			20	9.52	1.93	7.59	11.06	4.94	3.4	10.25	1.94	8.32	13.56	5.30	9.0	10.25	1.94	8.32	15.33	5.30	9.0
			25	10.57	1.94	8.63	15.11	5.44	2.8	11.25	1.95	9.30	17.94	5.77	8.3	11.25	1.95	9.30	19.94	5.77	8.3
			30	11.49	1.96	9.53	19.22	5.86	2.8	11.57	1.96	9.61	19.44	5.90	8.3	11.57	1.95	9.62	21.50	5.93	8.3
	0.57	30.3	10	7.44	1.77	5.67	3.00	4.20	4.1	7.97	1.80	6.16	5.00	4.42	9.7	7.97	1.80	6.16	6.17	4.42	9.7
			15	8.44	1.79	6.65	7.06	4.72	3.4	9.20	1.80	7.40	9.22	5.10	9.0	9.20	1.79	7.41	10.72	5.15	9.7
			20	9.65	1.80	7.84	10.94	5.35	3.4	10.38	1.81	8.57	13.50	5.73	9.0	10.38	1.80	8.58	15.28	5.76	9.0
			25	10.70	1.82	8.88	14.94	5.88	2.8	11.38	1.83	9.55	17.89	6.23	8.3	11.38	1.80	9.58	19.89	6.31	8.3
			30	11.62	1.84	9.78	19.06	6.33	2.8	11.70	1.84	9.86	19.33	6.37	8.3	11.70	1.80	9.89	21.39	6.48	8.3
40	0.28	4.6	10	6.41	2.50	3.91	4.00	2.56	4.1	6.86	2.55	4.31	5.67	2.69	9.7	6.86	2.53	4.33	6.72	2.71	9.7
			15	7.44	2.53	4.91	8.00	2.95	3.4	7.97	2.55	5.42	10.00	3.12	9.0	7.97	2.53	5.43	11.22	3.14	9.7
			20	8.52	2.55	5.97	12.00	3.34	3.4	9.07	2.56	6.51	14.33	3.55	9.0	9.07	2.53	6.54	15.72	3.58	9.0
			25	9.54	2.56	6.98	16.00	3.73	2.8	10.10	2.57	7.52	18.67	3.92	8.3	10.10	2.57	7.52	20.28	3.92	8.3
	0.43	13.8	10	6.52	2.27	4.25	3.89	2.87	4.1	6.99	2.30	4.69	5.61	3.03	9.7	6.99	2.31	4.68	6.61	3.02	9.7
			15	7.60	2.29	5.31	7.89	3.32	3.4	8.15	2.30	5.85	9.89	3.54	9.0	8.15	2.31	5.84	11.11	3.52	9.7
			20	8.70	2.30	6.40	11.83	3.78	3.4	9.25	2.31	6.94	14.22	4.00	9.0	9.25	2.34	6.92	15.61	3.96	9.0
			25	9.75	2.32	7.43	15.83	4.20	2.8	10.31	2.33	7.98	18.50	4.43	8.3	10.31	2.34	7.97	20.11	4.41	8.3
	0.57	27.7	10	6.57	2.23	4.34	3.83	2.95	4.1	7.02	2.27	4.75	5.56	3.09	9.7	7.02	2.29	4.73	6.61	3.07	9.7
			15	7.62	2.25	5.38	7.83	3.39	3.4	8.18	2.27	5.90	9.89	3.60	9.0	8.18	2.29	5.89	11.11	3.57	9.7
			20	8.73	2.26	6.46	11.78	3.86	3.4	9.31	2.28	7.03	14.17	4.08	9.0	9.31	2.29	7.02	15.61	4.07	9.0
			25	9.81	2.27	7.53	15.78	4.32	2.8	10.36	2.29	8.07	18.50	4.53	8.3	10.36	2.29	8.07	20.11	4.53	8.3
45	0.28	4.0	10	5.92	2.75	3.17	4.44	2.15	4.1	6.34	2.80	3.54	6.00	2.27	9.7	6.34	2.78	3.56	7.00	2.28	9.7
			15	6.99	2.77	4.22	8.56	2.52	3.4	7.44	2.80	4.64	10.44	2.66	9.0	7.44	2.78	4.66	11.56	2.68	9.7
			20	8.10	2.80	5.30	12.61	2.90	3.4	8.54	2.80	5.74	14.89	3.05	9.0	8.54	2.78	5.76	16.11	3.07	9.0
			25	9.15	2.80	6.34	16.72	3.26	2.8	9.65	2.82	6.83	19.28	3.42	8.3	9.65	2.82	6.83	20.72	3.42	8.3
	0.43	13.2	10	6.05	2.51	3.54	4.33	2.41	4.1	6.47	2.55	3.92	5.94	2.54	9.7	6.47	2.58	3.88	6.89	2.50	9.7
			15	7.12	2.53	4.59	8.33	2.81	3.4	7.57	2.55	5.02	10.28	2.97	9.0	7.57	2.58	4.99	11.33	2.93	9.7
			20	8.23	2.55	5.68	12.28	3.23	3.4	8.70	2.56	6.14	14.56	3.40	9.0	8.70	2.58	6.12	15.83	3.37	9.0
			25	9.04	2.56	6.49	15.39	3.53	2.8	9.52	2.57	6.95	17.89	3.71	8.3	9.52	2.58	6.93	19.28	3.68	8.3
	0.57	26.4	10	6.05	2.50	3.55	4.33	2.42	4.1	6.47	2.55	3.92	5.94	2.54	9.7	6.47	2.58	3.88	6.89	2.50	9.7
			15	7.12	2.53	4.60	8.33	2.82	3.4	7.60	2.55	5.05	10.28	2.98	9.0	7.60	2.58	5.01	11.33	2.94	9.7
			20	8.23	2.54	5.69	12.28	3.24	3.4	8.70	2.56	6.14	14.56	3.40	9.0	8.70	2.58	6.12	15.83	3.37	9.0
			25	9.04	2.55	6.49	15.39	3.55	2.8	9.52	2.57	6.95	17.89	3.71	8.3	9.52	2.58	6.93	19.22	3.68	8.3

LEGEND

EER — Energy Efficiency Ratio
EWT — Entering Water Temperature (C)
HR — Heat of Rejection (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

COOLING CAPACITIES
50PSW060

SOURCE			LOAD																			
	Flow		Flow 0.47 l/s							Flow 0.71 l/s							Flow 0.95 l/s					
EWT C	l/s	kPa	EWT C	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa
10	0.47	8.2	10	13.62	1.98	15.60	2.33	6.86	9.7	14.49	1.99	16.50	4.56	7.27	24.1	14.85	2.01	16.90	5.83	7.39	42.7
			15	14.91	2.01	16.90	6.56	7.42	9.7	15.83	2.01	17.80	9.06	7.88	22.7	16.25	2.03	18.30	10.44	7.99	41.4
			20	15.88	2.03	17.90	11.06	7.81	9.0	16.88	2.03	18.90	13.67	8.30	22.1	17.32	2.05	19.40	15.11	8.45	40.0
			25	16.56	2.05	18.60	15.67	8.08	8.3	17.59	2.05	19.60	18.44	8.58	21.4	18.06	2.07	20.10	19.89	8.71	39.3
			30	16.90	2.07	19.00	20.44	8.18	8.3	17.96	2.07	20.00	23.28	8.69	20.7	18.46	2.08	20.50	24.78	8.86	37.9
	0.71	23.4	10	14.20	2.01	16.20	2.00	7.07	9.7	15.08	2.01	17.10	4.33	7.50	24.1	15.48	2.03	17.50	5.67	7.61	42.7
			15	15.35	2.03	17.40	6.33	7.58	9.7	16.30	2.03	18.30	8.89	8.05	22.7	16.75	2.04	18.80	10.33	8.20	41.4
			20	16.22	2.04	18.30	10.89	7.94	9.0	17.25	2.04	19.30	13.56	8.45	22.1	17.69	2.07	19.80	15.00	8.53	40.0
			25	16.83	2.06	18.90	16.22	8.17	8.3	17.85	2.06	19.90	18.33	8.67	21.4	18.35	2.08	20.40	19.83	8.81	39.3
			30	17.11	2.07	19.20	20.33	8.25	8.3	18.17	2.07	20.20	23.22	8.76	20.7	18.67	2.09	20.80	24.72	8.93	37.9
	0.95	42.7	10	14.75	2.03	16.80	1.67	7.28	9.7	15.67	2.03	17.70	4.11	7.74	24.1	16.09	2.05	18.10	5.44	7.85	42.7
			15	15.80	2.04	17.80	6.11	7.74	9.7	16.77	2.04	18.80	8.72	8.21	22.7	17.22	2.06	19.30	10.17	8.37	41.4
			20	16.56	2.05	18.60	10.67	8.08	9.0	17.59	2.05	19.60	13.44	8.58	22.1	18.06	2.07	20.10	14.89	8.71	40.0
			25	17.06	2.07	19.10	15.39	8.26	8.3	18.14	2.07	20.20	18.22	8.78	21.4	18.61	2.09	20.70	19.78	8.90	39.3
			30	17.30	2.07	19.40	20.22	8.34	8.3	18.38	2.08	20.50	23.11	8.82	20.7	18.88	2.10	21.00	24.67	8.99	37.9
20	0.47	52.4	10	12.75	2.45	15.20	2.83	5.20	9.7	13.54	2.45	16.00	4.94	5.52	24.1	13.91	2.48	16.40	6.11	5.62	42.7
			15	14.20	2.49	16.70	7.00	5.69	9.7	15.09	2.49	17.60	6.06	6.05	22.7	15.48	2.52	18.00	10.61	6.15	41.4
			20	15.33	2.53	17.90	11.39	6.07	9.0	16.27	2.53	18.80	9.61	6.42	22.1	16.72	2.56	19.30	15.28	6.54	40.0
			25	16.12	2.57	18.70	15.94	6.28	8.3	17.11	2.57	19.70	18.61	6.67	21.4	17.56	2.59	20.20	20.06	6.78	39.3
			30	16.51	2.60	19.10	20.72	6.35	8.3	17.54	2.60	20.10	23.44	6.75	20.7	18.01	2.62	20.60	24.94	6.86	37.9
	0.71	20.7	10	13.33	2.48	15.80	2.50	5.36	9.7	14.14	2.48	16.60	4.72	5.69	24.1	14.54	2.51	17.00	5.94	5.79	42.7
			15	14.67	2.52	17.20	6.78	5.83	9.7	16.17	2.53	18.70	8.89	6.40	22.7	16.01	2.55	18.60	10.50	6.28	41.4
			20	15.69	2.55	18.20	11.17	6.15	9.0	17.09	2.56	19.60	13.56	6.68	22.1	17.11	2.58	19.70	15.17	6.63	40.0
			25	16.40	2.58	19.00	15.78	6.35	8.3	17.40	2.59	20.00	18.50	6.72	21.4	17.88	2.62	20.50	20.00	6.83	39.3
			30	16.75	2.62	19.40	20.33	6.40	8.3	17.77	2.62	20.40	23.33	6.79	20.7	18.27	2.64	20.90	24.89	6.92	37.9
	0.95	37.9	10	13.88	2.52	16.40	2.17	5.51	9.7	14.75	2.52	17.30	4.50	5.86	24.1	15.14	2.54	17.70	5.72	5.96	42.7
			15	15.14	2.54	17.70	6.50	5.96	9.7	16.06	2.55	18.60	9.00	6.30	22.7	16.51	2.57	19.10	10.33	6.41	41.4
			20	16.06	2.57	18.60	10.94	6.24	9.0	17.06	2.57	19.60	13.61	6.63	22.1	17.51	2.60	20.10	15.06	6.74	40.0
			25	16.67	2.60	19.30	15.61	6.41	8.3	17.69	2.61	20.30	18.39	6.79	21.4	18.19	2.63	20.80	19.89	6.91	39.3
			30	16.96	2.63	19.60	20.44	6.44	8.3	18.01	2.63	20.60	23.22	6.84	20.7	18.51	2.66	21.20	24.78	6.97	37.9
30	0.47	6.2	10	12.28	3.01	15.30	3.11	4.08	9.7	12.57	3.01	15.60	5.28	4.18	24.1	12.80	3.06	15.90	6.39	4.19	42.7
			15	13.93	3.04	17.00	7.17	4.58	9.7	14.28	3.04	17.30	9.67	4.69	22.7	14.54	3.08	17.60	10.89	4.72	41.4
			20	15.25	3.08	18.30	11.39	4.95	9.0	15.59	3.08	18.70	14.17	5.06	22.1	15.91	3.12	19.00	15.50	5.09	40.0
			25	16.22	3.13	19.40	15.83	5.18	8.3	16.59	3.12	19.70	18.78	5.31	21.4	16.90	3.17	20.10	20.22	5.33	39.3
			30	16.80	3.19	20.00	20.56	5.27	8.3	17.17	3.18	20.30	23.56	5.40	20.7	17.54	3.23	20.80	25.06	5.43	37.9
	0.71	19.3	10	12.86	3.06	15.90	2.78	4.20	9.7	13.14	3.06	16.20	5.06	4.30	24.1	13.41	3.11	16.50	6.22	4.31	42.7
			15	14.43	3.08	17.50	6.89	4.68	9.7	14.75	3.08	17.80	9.94	4.78	22.7	15.04	3.13	18.20	10.72	4.80	41.4
			20	15.64	3.12	18.80	11.17	5.02	9.0	16.01	3.12	19.10	14.00	5.14	22.1	16.33	3.17	19.50	15.39	5.16	40.0
			25	16.54	3.17	19.70	15.67	5.22	8.3	16.90	3.16	20.10	18.67	5.35	21.4	17.25	3.21	20.50	20.17	5.38	39.3
			30	17.32	3.24	20.60	20.28	5.35	8.3	17.69	3.24	20.90	23.39	5.46	20.7	18.06	3.29	21.30	24.89	5.49	37.9
	0.95	35.2	10	13.43	3.11	16.50	2.44	4.32	9.7	13.72	3.11	16.80	4.83	4.42	24.1	14.01	3.16	17.20	6.06	4.44	42.7
			15	14.91	3.12	18.00	6.56	4.77	9.7	15.25	3.12	18.40	9.28	4.88	22.7	15.54	3.17	18.70	10.61	4.90	41.4
			20	16.04	3.15	19.20	10.94	5.09	9.0	16.40	3.15	19.60	13.83	5.21	22.1	16.72	3.20	19.90	15.22	5.23	40.0
			25	16.85	3.19	20.00	15.50	5.28	8.3	17.22	3.19	20.40	18.56	5.40	21.4	17.56	3.24	20.80	20.06	5.42	39.3
			30	17.32	3.25	20.60	20.22	5.34	8.3	17.69	3.24	20.90	23.39	5.46	20.7	18.06	3.29	21.30	24.89	5.49	37.9
40	0.47	5.5	10	11.07	3.78	14.80	3.78	2.93	9.7	11.23	3.78	15.00	5.78	2.97	24.1	11.38	3.85	15.20	6.89	2.95	42.7
			15	12.80	3.74	16.50	7.78	3.42	9.7	12.99	3.75	16.70	10.17	3.47	22.7	13.14	3.82	17.00	11.33	3.44	41.4
			20	14.28	3.75	18.00	11.94	3.81	9.0	14.49	3.76	18.20	14.56	3.86	22.1	14.67	3.83	18.50	15.89	3.83	40.0
			25	15.51	3.80	19.30	16.28	4.08	8.3	15.72	3.81	19.50	19.11	4.12	21.4	15.93	3.88	19.80	20.50	4.11	39.3
			30	16.46	3.90	20.40	20.72	4.22	8.3	16.67	3.90	20.60	23.72	4.27	20.7	16.90	3.98	20.90	25.22	4.25	37.9
	0.71	17.2	10	11.59	3.85	15.40	3.50	3.01	9.7	11.78	3.85	15.60	5.61	3.06	24.1	11.94	3.93	15.90	6.72	3.04	42.7
			15	13.28	3.80	17.10	7.56	3.50	9.7	13.46	3.80	17.30	10.00	3.54	22.7	13.62	3.88	17.50	11.17	3.51	41.4
			20	14.67	3.80	18.50	11.72	3.86	9.0	14.88	3.80	18.70	14.44	3.91	22.1	15.09	3.88	19.00	15.78	3.89	40.0
			25	15.85	3.85	19.70	16.11	4.12	8.3	16.06	3.85	19.90	19.00	4.17	21.4	16.27	3.93	20.20	20.44	4.14	39.3
			30	16.75	3.94	20.70	20.56	4.25	8.3	16.98	3.94	20.90	23.61	4.31	20.7	17.22	4.02	21.20	25.11	4.29	37.9
	0.95	32.4	10	12.12	3.91	16.00	3.17	3.10	9.7	12.30	3.92	16.20	5.39	3.14	24.1	12.46	3.99	16.50	6.50	3.12	42.7
			15	13.72	3.85	17.60	7.28	3.56	9.7	13.91	3.86	17.80	9.78	3.60	22.7	14.09	3.94	18.00	11.00	3.58	41.4
			20	15.06	3.85	18.90	11.50	3.92	9.0	15.27	3.85	19.10	14.28	3.96	22.1	15.48	3.93	19.40	15.61	3.94	40.0
			25	16.17	3.89	20.10	15.89	4.16	8.3	16.40	3.90	20.30	18.83	4.21	21.4	16.62	3.97	20.60	20.33	4.19	39.3
			30	17.04	3.98	21.00	20.39	4.28	8.3	17.27	3.99	21.30	23.50	4.33	20.7	17.51	4.06	21.60	25.06	4.31	37.9
45	0.47	5.5	10	10.44	4.19	14.60	4.11	2.49	9.7	10.54	4.20	14.70	6.06	2.51	24.1	10.65	4.29	14.90	7.00	2.48	42.7
			15	12.12	4.17	16.30	8.17	2.91	9.7	12.25	4.18	16.40	10.44	2.93	22.7	12.36	4.26	16.60	11.50	2.90	41.4
			20	13.64	4.18	17.80	12.33	3.26	9.0	13.80	4.19	18.00	14.83	3.29	22.1	13.93	4.27	18.20	16.11	3.26	40.0
			25	15.01	4.23	19.20	16.56	3.55	8.3	15.17	4.24	19.40	19.33	3.58	21.4	15.30	4.33	19.60	20.67	3.53	39.3
			30	16.17	4.32	20.50	20.89	3.74	8.3	16.33	4.33	20.70	23.89	3.77	20.7	16.48	4.42	20.90	25.33	3.73	37.9
	0.71	16.5	10	10.96	4.27	15.20	1.06	2.57	9.7	11.07	4.28	15.30	5.67	2.59	24.1	11.17	4.36	15.50	6.83	2.56	42.7
			15	12.59	4.24	16.80	7.94	2.97	9.7	12.70	4.25	16.90	10.11	2.99	22.7	12.83	4.34	17.20	11.39	2.96	41.4
			20	14.04	4.24	18.30	12.11	3.31	9.0	14.20	4.25	18.40	14.56	3.34	22.1	14.33	4.34	18.70	16.00	3.30	40.0
			25	15.35	4.29	19.60	16.39	3.58	8.3	15.51	4.30	19.80	19.06	3.61	21.4	15.67	4.33	20.00	20.61	3.62	39.3
			30	16.48	4.37	20.90	20.50	3.77	8.3	16.67	4.38	21.00	23.61	3.81	20.7	16.83	4.47	21.30	25.28	3.76	37.9
	0.95	31.7	10	11.49	4.35	15.80	3.50	2.64	9.7	11.59	4.36	16.00	5.67	2.66	24.1	11.70	4.45	16.20	6.67	2.63	42.7
			15	13.04	4.31	17.30	7.67	3.03	9.7	13.17	4.31	17.50	10.11	3.05	22.7	13.30	4.40	17.70	11.28	3.02	41.4
			20	14.43	4.30	18.70	11.83	3.36	9.0	14.59	4.31	18.90	14.56	3.38	22.1	14.72	4.40	19.10	15.83	3.35	40.0
			25	15.69	4.34	20.00	16.17	3.62	8.3	15.85	4.35	20.20	19.06	3.65	21.4	16.01	4.44	20.40	20.50	3.61	39.3
			30	16.80	4.42	21.20	20.56	3.80	8.3	16.98	4.43	21.40	23.61	3.84	20.7	17.14	4.52	21.70	25.17	3.79	37.9

LEGEND

EER — Energy Efficiency Ratio
EWT — Entering Water Temperature (C)
HR — Heat of Rejection (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

COOLING CAPACITIES (cont)

50PSW120

SOURCE			LOAD																			
	Flow		Flow 0.95 l/s							Flow 1.42 l/s						Flow 1.89 l/s						
EWT C	l/s	kPa	EWT C	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa
10	0.95	9.7	10	27.24	3.97	31.2	2.33	6.86	10.3	28.97	3.99	32.96	4.56	7.27	26.2	29.71	4.02	33.73	5.83	7.39	46.9
			15	29.81	4.02	33.8	6.56	7.42	10.3	31.65	4.02	35.67	9.06	7.88	25.5	32.49	4.07	36.56	10.44	7.99	45.5
			20	31.76	4.07	35.8	11.06	7.81	9.7	33.76	4.07	37.82	13.67	8.30	24.1	34.65	4.10	38.75	15.11	8.45	44.1
			25	33.12	4.10	37.2	15.67	8.08	9.7	35.18	4.10	39.28	18.44	8.58	23.4	36.12	4.15	40.27	19.89	8.71	42.8
			30	33.81	4.13	37.9	20.44	8.18	9.7	35.91	4.13	40.04	23.28	8.69	22.8	36.91	4.17	41.08	24.78	8.86	42.1
	1.42	26.2	10	28.39	4.02	32.4	2.00	7.07	10.3	30.15	4.02	34.17	4.33	7.50	26.2	30.97	4.07	35.04	5.67	7.61	46.9
			15	30.71	4.05	34.8	6.33	7.58	10.3	32.60	4.05	36.65	8.89	8.05	25.5	33.49	4.08	37.58	10.33	8.20	45.5
			20	32.44	4.08	36.5	10.89	7.94	9.7	34.49	4.08	38.58	13.56	8.45	24.1	35.39	4.15	39.54	15.00	8.53	44.1
			25	33.65	4.12	37.8	16.22	8.17	9.7	35.70	4.12	39.82	18.33	8.67	23.4	36.70	4.17	40.87	19.83	8.81	42.8
			30	34.23	4.15	38.4	20.33	8.25	9.7	36.33	4.15	40.48	23.22	8.76	22.8	37.33	4.18	41.51	24.72	8.93	42.1
	1.89	26.2	10	29.50	4.05	33.5	1.67	7.28	10.3	31.34	4.05	35.39	4.11	7.74	26.2	32.18	4.10	36.28	5.44	7.85	46.9
			15	31.60	4.08	35.7	6.11	7.74	10.3	33.55	4.08	37.63	8.72	8.21	25.5	34.44	4.12	38.56	10.17	8.37	45.5
			20	33.12	4.10	37.2	10.67	8.08	9.7	35.18	4.10	39.28	13.44	8.58	24.1	36.12	4.15	40.27	14.89	8.71	44.1
			25	34.12	4.13	38.3	15.39	8.26	9.7	36.28	4.13	40.41	18.22	8.78	23.4	37.23	4.18	41.41	19.78	8.90	42.8
			30	34.60	4.15	38.7	20.22	8.34	9.7	36.75	4.17	40.92	23.11	8.82	22.8	37.75	4.20	41.95	24.67	8.99	42.1
20	0.95	8.3	10	25.50	4.90	30.4	2.83	5.20	10.3	27.08	4.90	31.98	4.94	5.52	26.2	27.81	4.95	32.77	6.11	5.62	46.9
			15	28.39	4.99	33.4	7.00	5.69	10.3	30.18	4.99	35.17	6.06	6.05	25.5	30.97	5.03	36.00	10.61	6.15	45.5
			20	30.65	5.05	35.7	11.39	6.07	9.7	32.55	5.07	37.61	9.61	6.42	24.1	33.44	5.12	38.56	15.28	6.54	44.1
			25	32.23	5.13	37.4	15.94	6.28	9.7	34.23	5.13	39.36	18.61	6.67	23.4	35.12	5.18	40.31	20.06	6.78	42.8
			30	33.02	5.20	38.2	20.72	6.35	9.7	35.07	5.20	40.27	23.44	6.75	22.8	36.02	5.25	41.26	24.94	6.86	42.1
	1.42	22.8	10	26.66	4.97	31.6	2.50	5.36	10.3	28.29	4.97	33.26	4.72	5.69	26.2	29.08	5.02	34.09	5.94	5.79	46.9
			15	29.34	5.03	34.4	6.78	5.83	10.3	32.34	5.05	37.39	8.89	6.40	25.5	32.02	5.10	37.12	10.50	6.28	45.5
			20	31.39	5.10	36.5	11.17	6.15	9.7	34.18	5.12	39.29	13.56	6.68	24.1	34.23	5.17	39.40	15.17	6.63	44.1
			25	32.81	5.17	38.0	15.78	6.35	9.7	34.81	5.18	39.99	18.50	6.72	23.4	35.75	5.23	40.99	20.00	6.83	42.8
			30	33.49	5.23	38.7	20.33	6.40	9.7	35.54	5.23	40.78	23.33	6.79	22.8	36.54	5.28	41.82	24.89	6.92	42.1
	1.89	42.1	10	27.76	5.03	32.8	2.17	5.51	10.3	29.50	5.03	34.53	4.50	5.86	26.2	30.29	5.08	35.37	5.72	5.96	46.9
			15	30.29	5.08	35.4	6.50	5.96	10.3	32.13	5.10	37.23	9.00	6.30	25.5	33.02	5.15	38.17	10.33	6.41	45.5
			20	32.13	5.15	37.3	10.94	6.24	9.7	34.12	5.15	39.27	13.61	6.63	24.1	35.02	5.20	40.22	15.06	6.74	44.1
			25	33.34	5.20	38.5	15.61	6.41	9.7	35.39	5.22	40.60	18.39	6.79	23.4	36.38	5.26	41.65	19.89	6.91	42.8
			30	33.91	5.26	39.2	20.44	6.44	9.7	36.02	5.26	41.28	23.22	6.84	22.8	37.02	5.31	42.33	24.78	6.97	42.1
30	0.95	6.9	10	24.55	6.02	30.6	3.11	4.08	10.3	25.13	6.02	31.15	5.28	4.18	26.2	25.61	6.12	31.72	6.39	4.19	46.9
			15	27.87	6.08	34.0	7.17	4.58	10.3	28.55	6.08	34.63	9.67	4.69	25.5	29.08	6.17	35.24	10.89	4.72	45.5
			20	30.50	6.17	36.7	11.39	4.95	9.7	31.18	6.17	37.35	14.17	5.06	24.1	31.81	6.25	38.06	15.50	5.09	44.1
			25	32.44	6.26	38.7	15.83	5.18	9.7	33.18	6.25	39.43	18.78	5.31	23.4	33.81	6.35	40.16	20.22	5.33	42.8
			30	33.60	6.38	40.0	20.56	5.27	9.7	34.33	6.36	40.70	23.56	5.40	22.8	35.07	6.46	41.53	25.06	5.43	42.1
	1.42	20.7	10	25.71	6.12	31.8	2.78	4.20	10.3	26.29	6.12	32.41	5.06	4.30	26.2	26.82	6.22	33.03	6.22	4.31	46.9
			15	28.87	6.17	35.0	6.89	4.68	10.3	29.50	6.17	35.66	9.94	4.78	25.5	30.08	6.26	36.34	10.72	4.80	45.5
			20	31.28	6.23	37.5	11.17	5.02	9.7	32.02	6.23	38.25	14.00	5.14	24.1	32.65	6.33	38.98	15.39	5.16	44.1
			25	33.07	6.33	39.4	15.67	5.22	9.7	33.81	6.31	40.12	18.67	5.35	23.4	34.49	6.41	40.90	20.17	5.38	42.8
			30	34.65	6.48	41.1	20.28	5.35	9.7	35.39	6.48	41.86	23.39	5.46	22.8	36.12	6.58	42.70	24.89	5.49	42.1
	1.89	38.6	10	26.87	6.22	33.1	2.44	4.32	10.3	27.45	6.22	33.66	4.83	4.42	26.2	28.02	6.31	34.34	6.06	4.44	46.9
			15	29.81	6.25	36.1	6.56	4.77	10.3	30.50	6.25	36.74	9.28	4.88	25.5	31.07	6.35	37.42	10.61	4.90	45.5
			20	32.07	6.30	38.4	10.94	5.09	9.7	32.81	6.30	39.11	13.83	5.21	24.1	33.44	6.40	39.84	15.22	5.23	44.1
			25	33.70	6.38	40.1	15.50	5.28	9.7	34.44	6.38	40.82	18.56	5.40	23.4	35.12	6.48	41.60	20.06	5.42	42.8
			30	34.65	6.49	41.1	20.22	5.34	9.7	35.39	6.48	41.86	23.39	5.46	22.8	36.12	6.58	42.70	24.89	5.49	42.1
40	0.95	6.2	10	22.14	7.56	29.7	3.78	2.93	10.3	22.45	7.56	30.01	5.78	2.97	26.2	22.77	7.71	30.47	6.89	2.95	46.9
			15	25.61	7.48	33.1	7.78	3.42	10.3	25.97	7.49	33.47	10.17	3.47	25.5	26.29	7.64	33.93	11.33	3.44	45.5
			20	28.55	7.49	36.0	11.94	3.81	9.7	28.97	7.51	36.48	14.56	3.86	24.1	29.34	7.66	37.00	15.89	3.83	44.1
			25	31.02	7.61	38.6	16.28	4.08	9.7	31.44	7.63	39.07	19.11	4.12	23.4	31.86	7.76	39.62	20.50	4.11	42.8
			30	32.91	7.81	40.7	20.72	4.22	9.7	33.34	7.81	41.14	23.72	4.27	22.8	33.81	7.95	41.76	25.22	4.25	42.1
	1.42	19.3	10	23.19	7.69	30.9	3.50	3.01	10.3	23.56	7.71	31.26	5.61	3.06	26.2	23.87	7.86	31.73	6.72	3.04	46.9
			15	26.55	7.59	34.1	7.56	3.50	10.3	26.92	7.61	34.53	10.00	3.54	25.5	27.24	7.76	34.99	11.17	3.51	45.5
			20	29.34	7.59	36.9	11.72	3.86	9.7	29.76	7.61	37.37	14.44	3.91	24.1	30.18	7.76	37.94	15.78	3.89	44.1
			25	31.71	7.69	39.4	16.11	4.12	9.7	32.13	7.71	39.83	19.00	4.17	23.4	32.55	7.86	40.40	20.44	4.14	42.8
			30	33.49	7.89	41.4	20.56	4.25	9.7	33.97	7.89	41.85	23.61	4.31	22.8	34.44	8.04	42.48	25.11	4.29	42.1
	1.89	35.9	10	24.24	7.82	32.1	3.17	3.10	10.3	24.61	7.84	32.45	5.39	3.14	26.2	24.92	7.99	32.91	6.50	3.12	46.9
			15	27.45	7.71	35.2	7.28	3.56	10.3	27.81	7.72	35.54	9.78	3.60	25.5	28.18	7.87	36.05	11.00	3.58	45.5
			20	30.13	7.69	37.8	11.50	3.92	9.7	30.55	7.71	38.26	14.28	3.96	24.1	30.97	7.86	38.82	15.61	3.94	44.1
			25	32.34	7.77	40.1	15.89	4.16	9.7	32.81	7.79	40.60	18.83	4.21	23.4	33.23	7.94	41.17	20.33	4.19	42.8
			30	34.07	7.95	42.0	20.39	4.28	9.7	34.54	7.97	42.51	23.50	4.33	22.8	35.02	8.12	43.14	25.06	4.31	42.1
45	0.95	5.5	10	20.87	8.38	29.3	4.11	2.49	10.3	21.08	8.40	29.48	6.06	2.51	26.2	21.29	8.58	29.87	7.00	2.48	46.9
			15	24.24	8.33	32.6	8.17	2.91	10.3	24.50	8.36	32.87	10.44	2.93	25.5	24.71	8.53	33.24	11.50	2.90	45.5
			20	27.29	8.36	35.7	12.33	3.26	9.7	27.60	8.38	35.98	14.83	3.29	24.1	27.87	8.54	36.41	16.11	3.26	44.1
			25	30.02	8.46	38.5	16.56	3.55	9.7	30.34	8.48	38.82	19.33	3.58	23.4	30.60	8.66	39.26	20.67	3.53	42.8
			30	32.34	8.64	41.0	20.89	3.74	9.7	32.65	8.66	41.31	23.89	3.77	22.8	32.97	8.84	41.81	25.33	3.73	42.1
	1.42	18.6	10	21.93	8.54	30.5	1.06	2.57	10.3	22.14	8.56	30.70	5.67	2.59	26.2	22.35	8.72	31.07	6.83	2.56	46.9
			15	25.19	8.48	33.7	7.94	2.97	10.3	25.40	8.50	33.89	10.11	2.99	25.5	25.66	8.68	34.33	11.39	2.96	45.5
			20	28.08	8.48	36.6	12.11	3.31	9.7	28.39	8.50	36.89	14.56	3.34	24.1	28.66	8.68	37.33	16.00	3.30	44.1
			25	30.71	8.58	39.3	16.39	3.58	9.7	31.02	8.59	39.62	19.06	3.61	23.4	31.34	8.66	40.00	20.61	3.62	42.8
			30	32.97	8.74	41.7	20.50	3.77	9.7	33.34	8.76	42.09	23.61	3.81	22.8	33.65	8.94	42.59	25.28	3.76	42.1
	1.89	35.2	10	22.98	8.71	31.7	3.50	2.64	10.3	23.19	8.72	31.91	5.67	2.66	26.2	23.40	8.91	32.30	6.67	2.63	46.9
			15	26.08	8.61	34.7	7.67	3.03	10.3	26.34	8.63	34.97	10.11	3.05	25.5	26.61	8.81	35.41	11.28	3.02	45.5
			20	28.87	8.59	37.5	11.83	3.36	9.7	29.18	8.63	37.81	14.56	3.38	24.1	29.44	8.79	38.23	15.83	3.35	44.1
			25	31.39	8.68	40.1	16.17	3.62	9.7	31.71	8.69	40.40	19.06	3.65	23.4	32.02	8.87	40.89	20.50	3.61	42.8
			30	33.60	8.84	42.4	20.56	3.80	9.7	33.97	8.86	42.82	23.61	3.84	22.8	34.28	9.04	43.32	25.17	3.79	42.1

LEGEND

EER — Energy Efficiency Ratio
EWT — Entering Water Temperature (C)
HR — Heat of Rejection (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

COOLING CAPACITIES (cont)

50PSW180

SOURCE			LOAD																			
	Flow		Flow 1.14 l/s							Flow 1.70 l/s						Flow 2.21 l/s						
EWT C	l/s	kPa	EWT C	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa
10	1.14	2.96	10	Operation Not Recommended						36.3	5.70	42.0	4.8	6.4	11.64	37.1	5.74	42.8	6.0	6.5	22.64
			15	37.7	5.68	43.4	6.8	6.6	2.17	39.4	5.73	45.1	9.4	6.9	11.01	40.1	5.75	45.9	10.7	7.0	21.68
			20	39.8	5.74	45.6	11.4	6.9	1.38	41.4	5.78	47.1	14.1	7.2	10.38	42.1	5.80	47.9	15.4	7.3	20.72
			25	42.3	5.81	48.1	15.8	7.3	1.06	43.6	5.84	49.5	18.8	7.5	9.91	44.3	5.86	50.1	20.2	7.6	19.98
			30	43.9	5.85	49.7	20.5	7.5	0.88	45.0	5.88	50.9	23.6	7.7	9.47	45.5	5.90	51.4	25.1	7.7	19.30
	1.70	11.65	10	Operation Not Recommended						36.8	5.25	42.1	4.7	7.0	11.64	37.6	5.27	42.9	5.9	7.1	22.64
			15	38.2	5.28	43.5	6.7	7.2	2.17	39.8	5.31	45.1	9.3	7.5	11.01	25.6	5.32	30.9	10.6	4.8	21.68
			20	40.2	5.31	45.5	11.3	7.6	1.38	41.7	5.34	47.1	14.0	7.8	10.38	42.4	5.35	47.8	15.4	7.9	20.72
			25	42.6	5.35	48.0	15.8	8.0	1.06	44.0	5.38	49.3	18.7	8.2	9.91	44.6	5.39	49.9	20.2	8.3	19.98
			30	44.2	5.38	49.5	20.4	8.2	0.88	45.3	5.40	50.7	23.5	8.4	9.47	45.8	5.41	51.2	25.0	8.5	19.30
	2.21	22.61	10	Operation Not Recommended						37.0	5.06	42.0	4.7	7.3	11.64	37.8	5.07	42.9	5.9	7.5	22.64
			15	38.4	5.08	43.5	6.7	7.6	2.17	40.0	5.11	45.1	9.3	7.8	11.01	40.8	5.11	45.9	10.6	8.0	21.68
			20	40.4	5.10	45.5	11.3	7.9	1.38	41.9	5.13	47.0	14.0	8.2	10.38	42.6	5.14	47.7	15.4	8.3	20.72
			25	42.8	5.14	47.9	15.7	8.3	1.06	44.1	5.16	49.3	18.7	8.5	9.91	44.7	5.17	49.9	20.2	8.7	19.98
			30	44.3	5.16	49.4	20.4	8.6	0.88	45.4	5.17	50.6	23.5	8.8	9.47	45.9	5.18	51.1	25.0	8.9	19.30
20	1.14	1.38	10	Operation Not Recommended						34.0	6.70	40.7	5.1	5.1	11.64	34.9	6.73	41.6	6.2	5.2	22.64
			15	35.8	6.74	42.5	7.3	5.3	2.17	37.6	6.79	44.4	9.6	5.5	11.01	38.5	6.82	45.3	10.8	5.6	21.68
			20	38.3	6.81	45.2	11.7	5.6	1.38	40.1	6.86	46.9	14.3	5.8	10.38	40.9	6.88	47.7	15.6	5.9	20.72
			25	41.2	6.89	48.1	16.1	6.0	1.06	42.7	6.93	49.7	18.9	6.2	9.91	43.4	6.95	50.3	20.3	6.2	19.98
			30	43.1	6.94	50.0	20.7	6.2	0.88	44.4	6.97	51.3	23.7	6.4	9.47	44.9	6.99	51.9	25.1	6.4	19.30
	1.70	10.38	10	Operation Not Recommended						34.9	6.33	41.2	5.0	5.5	11.64	35.8	6.35	42.1	6.1	5.6	22.64
			15	36.6	6.36	42.9	7.1	5.7	2.17	38.3	6.39	44.7	9.5	6.0	11.01	39.2	6.41	45.6	10.8	6.1	21.68
			20	39.0	6.39	45.4	11.6	6.1	1.38	40.6	6.42	47.1	14.2	6.3	10.38	41.4	6.44	47.8	15.5	6.4	20.72
			25	41.7	6.45	48.2	16.0	6.5	1.06	43.1	6.47	49.6	18.8	6.7	9.91	43.8	6.48	50.3	20.3	6.8	19.98
			30	43.4	6.47	49.9	20.6	6.7	0.88	44.6	6.50	51.1	23.6	6.9	9.47	45.1	6.50	51.6	25.1	6.9	19.30
	2.21	20.72	10	Operation Not Recommended						35.2	6.16	41.4	5.0	5.7	11.64	36.1	6.17	42.3	6.1	5.9	22.64
			15	36.9	6.18	43.1	7.0	6.0	2.17	38.6	6.20	44.8	9.5	6.2	11.01	39.5	6.21	45.7	10.7	6.4	21.68
			20	39.2	6.20	45.4	11.5	6.3	1.38	40.9	6.22	47.1	14.2	6.6	10.38	41.6	6.23	47.9	15.5	6.7	20.72
			25	41.9	6.23	48.1	15.9	6.7	1.06	43.3	6.25	49.6	18.8	6.9	9.91	43.9	6.26	50.2	20.2	7.0	19.98
			30	43.6	6.25	49.8	20.6	7.0	0.88	44.8	6.27	51.0	23.6	7.1	9.47	45.3	6.27	51.5	25.1	7.2	19.30
30	1.14	0.88	10	Operation Not Recommended						31.1	7.77	38.9	5.6	4.0	11.64	32.0	7.80	39.8	6.5	4.1	22.64
			15	33.2	7.83	41.0	7.8	4.2	2.17	35.1	7.89	42.9	10.0	4.4	11.01	36.0	7.92	43.9	11.1	4.5	21.68
			20	36.1	7.92	44.1	12.2	4.6	1.38	38.0	7.97	46.0	14.6	4.8	10.38	38.9	8.00	46.9	15.8	4.9	20.72
			25	39.4	8.01	47.4	16.5	4.9	1.06	41.2	8.07	49.2	19.1	5.1	9.91	42.0	8.10	50.1	20.5	5.2	19.98
			30	41.8	8.08	49.9	20.9	5.2	0.88	43.5	8.14	51.6	23.8	5.3	9.47	44.3	8.16	52.4	25.2	5.4	19.30
	1.70	9.47	10	Operation Not Recommended						32.1	7.41	39.5	5.4	4.3	11.64	33.0	7.42	40.5	6.4	4.5	22.64
			15	34.2	7.45	41.6	7.6	4.6	2.17	36.1	7.48	43.5	9.8	4.8	11.01	37.0	7.50	44.5	11.0	4.9	21.68
			20	37.1	7.49	44.5	12.0	4.9	1.38	38.9	7.52	46.4	14.4	5.2	10.38	39.8	7.54	47.3	15.7	5.3	20.72
			25	40.2	7.55	47.8	16.3	5.3	1.06	41.9	7.58	49.5	19.0	5.5	9.91	42.7	7.60	50.3	20.4	5.6	19.98
			30	42.4	7.59	50.0	20.8	5.6	0.88	44.0	7.62	51.6	23.7	5.8	9.47	44.7	7.63	52.3	25.2	5.9	19.30
	2.21	19.30	10	Operation Not Recommended						32.6	7.23	39.8	5.3	4.5	11.64	33.5	7.25	40.8	6.4	4.6	22.64
			15	34.6	7.26	41.9	7.5	4.8	2.17	36.5	7.29	43.8	9.8	5.0	11.01	37.4	7.30	44.7	11.0	5.1	21.68
			20	37.5	7.29	44.7	11.9	5.1	1.38	39.3	7.32	46.6	14.4	5.4	10.38	40.2	7.32	47.5	15.7	5.5	20.72
			25	40.6	7.33	47.9	16.2	5.5	1.06	42.2	7.36	49.6	19.0	5.7	9.91	43.0	7.37	50.3	20.4	5.8	19.98
			30	42.7	7.35	50.0	20.8	5.8	0.88	44.1	7.38	51.5	23.7	6.0	9.47	44.8	7.39	52.2	25.2	6.1	19.30
40	1.14	0.58	10	Operation Not Recommended						26.8	9.11	35.9	6.2	2.9	11.64	27.7	9.15	36.9	7.0	3.0	22.64
			15	29.6	9.21	38.8	8.6	3.2	2.17	31.6	9.28	40.8	10.5	3.4	11.01	32.6	9.31	41.9	11.5	3.5	21.68
			20	33.2	9.33	42.6	12.8	3.6	1.38	35.2	9.40	44.6	15.0	3.7	10.38	36.1	9.43	45.5	16.1	3.8	20.72
			25	36.8	9.45	46.2	17.0	3.9	1.06	37.8	9.45	47.2	19.6	4.0	9.91	38.6	9.48	48.1	20.8	4.1	19.98
			30	Operation Not Recommended																	
	1.70	8.67	10	Operation Not Recommended						28.2	8.73	36.9	6.0	3.2	11.64	29.1	8.75	37.8	6.9	3.3	22.64
			15	30.7	8.79	39.5	8.4	3.5	2.17	32.6	8.83	41.5	10.3	3.7	11.01	33.6	8.85	42.5	11.4	3.8	21.68
			20	34.1	8.84	42.9	12.6	3.9	1.38	36.1	8.89	45.0	14.8	4.1	10.38	37.0	8.91	45.9	16.0	4.2	20.72
			25	37.7	8.92	46.6	16.8	4.2	1.06	39.5	8.96	48.4	19.4	4.4	9.91	40.3	8.98	49.3	20.6	4.5	19.98
			30	40.2	8.97	49.2	21.3	4.5	0.88	38.5	8.92	47.4	24.5	4.3	9.47	39.4	8.94	48.4	25.7	4.4	19.30
	2.21	18.04	10	Operation Not Recommended																	
			15	31.2	8.59	39.8	8.2	3.6	2.17	33.2	8.62	41.8	10.3	3.8	11.01	34.1	8.63	42.8	11.3	4.0	21.68
			20	34.6	8.63	43.2	12.5	4.0	1.38	36.5	8.66	45.2	14.8	4.2	10.38	37.5	8.67	46.2	15.9	4.3	20.72
			25	38.2	8.69	46.8	16.7	4.4	1.06	40.0	8.71	48.7	19.3	4.6	9.91	40.9	8.73	49.6	20.6	4.7	19.98
			30	40.8	8.71	49.5	21.2	4.7	0.88	42.4	8.74	51.2	23.9	4.9	9.47	43.2	8.76	51.9	25.3	4.9	19.30

LEGEND

EER — Energy Efficiency Ratio
EWT — Entering Water Temperature (C)
HR — Heat of Rejection (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

COOLING CAPACITIES (cont)

50PSW360

SOURCE			LOAD																			
	Flow		Flow 2.21 l/s							Flow 3.34 l/s							Flow 4.42 l/s					
EWT C	l/s	kPa	EWT C	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa	Output kW	Input kW	HR kW	LWT C	EER W/W	WPD kPa
10	2.21	8.20	10	Operation Not Recommended						72.59	11.40	83.99	4.81	6.37	24.75	74.22	11.47	85.69	5.98	6.47	44.82
			15	75.48	11.36	86.84	6.82	6.64	7.58	78.73	11.45	90.18	9.37	6.88	23.72	80.28	11.49	91.77	10.65	6.99	42.61
			20	79.64	11.48	91.12	11.37	6.94	7.12	82.70	11.56	94.26	14.08	7.15	22.94	84.11	11.60	95.71	15.44	7.25	41.21
			25	84.60	11.61	96.21	15.84	7.29	6.60	87.29	11.68	98.97	18.76	7.47	21.96	88.50	11.72	100.22	20.21	7.55	39.51
			30	87.73	11.70	99.43	20.50	7.50	6.27	90.06	11.76	101.82	23.56	7.66	21.27	91.05	11.79	102.84	25.07	7.72	38.40
	3.34	24.75	10	Operation Not Recommended						73.61	10.50	84.11	4.73	7.01	24.75	75.25	10.53	85.78	5.92	7.15	44.82
			15	76.40	10.55	86.95	6.72	7.24	7.58	79.66	10.61	90.27	9.30	7.51	23.72	51.18	10.64	61.82	10.60	4.81	42.61
			20	80.45	10.62	91.07	11.29	7.58	7.12	83.46	10.67	94.13	14.03	7.82	22.94	84.87	10.69	95.56	15.40	7.94	41.21
			25	85.28	10.70	95.98	15.76	7.97	6.60	87.93	10.76	98.69	18.71	8.17	21.96	89.11	10.78	99.89	20.17	8.27	39.51
			30	88.33	10.76	99.09	20.43	8.21	6.27	90.61	10.80	101.41	23.52	8.39	21.27	91.60	10.82	102.42	25.04	8.47	38.40
	4.42	44.82	10	Operation Not Recommended						73.93	10.12	84.05	4.71	7.31	24.75	75.59	10.14	85.73	5.91	7.45	44.82
			15	76.74	10.16	86.90	6.69	7.55	7.58	80.01	10.21	90.22	9.28	7.84	23.72	81.53	10.22	91.75	10.58	7.98	42.61
			20	80.80	10.20	91.00	11.25	7.92	7.12	83.80	10.25	94.05	14.01	8.18	22.94	85.19	10.27	95.46	15.39	8.30	41.21
			25	85.60	10.27	95.87	15.73	8.33	6.60	88.22	10.32	98.54	18.69	8.55	21.96	89.38	10.33	99.71	20.16	8.65	39.51
			30	88.57	10.31	98.88	20.41	8.59	6.27	90.82	10.34	101.16	23.50	8.78	21.27	91.79	10.36	102.15	25.03	8.86	38.40
20	2.21	7.12	10	Operation Not Recommended						67.98	13.40	81.38	5.14	5.07	24.75	69.78	13.46	83.24	6.22	5.18	44.82
			15	71.58	13.48	85.06	7.25	5.31	7.58	75.18	13.58	88.76	9.62	5.54	23.72	76.93	13.63	90.56	10.83	5.64	42.61
			20	76.69	13.61	90.30	11.69	5.63	7.12	80.11	13.71	93.82	14.27	5.84	22.94	81.73	13.75	95.48	15.57	5.94	41.21
			25	82.41	13.78	96.19	16.07	5.98	6.60	85.45	13.86	99.31	18.89	6.17	21.96	86.78	13.90	100.68	20.30	6.24	39.51
			30	86.15	13.87	100.02	20.67	6.21	6.27	88.70	13.94	102.64	23.66	6.36	21.27	89.78	13.98	103.76	25.14	6.42	38.40
	3.34	22.94	10	Operation Not Recommended						69.72	12.66	82.38	5.01	5.51	24.75	71.52	12.69	84.21	6.13	5.64	44.82
			15	73.12	12.72	85.84	7.08	5.75	7.58	76.66	12.77	89.43	9.52	6.00	23.72	78.35	12.81	91.16	10.76	6.12	42.61
			20	77.95	12.78	90.73	11.56	6.10	7.12	81.27	12.84	94.11	14.19	6.33	22.94	82.82	12.87	95.69	15.51	6.44	41.21
			25	83.41	12.89	96.30	15.97	6.47	6.60	86.29	12.94	99.23	18.83	6.67	21.96	87.56	12.96	100.52	20.26	6.76	39.51
			30	86.86	12.94	99.80	20.59	6.71	6.27	89.26	12.99	102.25	23.62	6.87	21.27	90.22	13.00	103.22	25.11	6.94	38.40
	4.42	41.26	10	Operation Not Recommended						70.49	12.31	82.80	4.96	5.73	24.75	72.27	12.33	84.60	6.09	5.86	44.82
			15	73.77	12.35	86.12	7.01	5.97	7.58	77.29	12.40	89.69	9.47	6.23	23.72	78.95	12.42	91.37	10.72	6.36	42.61
			20	78.47	12.39	90.86	11.50	6.33	7.12	81.75	12.44	94.19	14.15	6.57	22.94	83.27	12.45	95.72	15.49	6.69	41.21
			25	83.82	12.46	96.28	15.92	6.73	6.60	86.64	12.50	99.14	18.80	6.93	21.96	87.89	12.52	100.41	20.24	7.02	39.51
			30	87.17	12.50	99.67	20.56	6.97	6.27	89.51	12.54	102.05	23.60	7.14	21.27	90.50	12.54	103.04	25.10	7.22	38.40
30	2.21	6.29	10	Operation Not Recommended						62.16	15.54	77.70	5.55	4.00	24.75	63.98	15.60	79.58	6.53	4.10	44.82
			15	66.40	15.66	82.06	7.81	4.24	7.58	70.10	15.78	85.88	9.99	4.44	23.72	71.93	15.83	87.76	11.10	4.54	42.61
			20	72.29	15.83	88.12	12.17	4.57	7.12	75.98	15.94	91.92	14.57	4.77	22.94	77.78	15.99	93.77	15.79	4.86	41.21
			25	78.83	16.02	94.85	16.46	4.92	6.60	82.36	16.13	98.49	19.11	5.11	21.96	84.02	16.19	100.21	20.45	5.19	39.51
			30	83.64	16.16	99.80	20.94	5.18	6.27	86.99	16.27	103.26	23.78	5.35	21.27	88.54	16.32	104.86	25.20	5.43	38.40
	3.34	21.29	10	Operation Not Recommended						64.20	14.81	79.01	5.41	4.33	24.75	66.09	14.84	80.93	6.42	4.45	44.82
			15	68.33	14.89	83.22	7.60	4.59	7.58	72.11	14.95	87.06	9.84	4.82	23.72	73.97	14.99	88.96	10.99	4.93	42.61
			20	74.10	14.97	89.07	11.97	4.95	7.12	77.78	15.04	92.82	14.44	5.17	22.94	79.54	15.08	94.62	15.69	5.27	41.21
			25	80.43	15.09	95.52	16.29	5.33	6.60	83.83	15.16	98.99	19.00	5.53	21.96	85.39	15.19	100.58	20.38	5.62	39.51
			30	84.89	15.17	100.06	20.80	5.60	6.27	87.96	15.23	103.19	23.71	5.78	21.27	89.33	15.26	104.59	25.16	5.85	38.40
	4.42	38.47	10	Operation Not Recommended						65.14	14.46	79.60	5.34	4.50	24.75	67.04	14.49	81.53	6.37	4.63	44.82
			15	69.21	14.52	83.73	7.50	4.77	7.58	73.03	14.58	87.61	9.78	5.01	23.72	74.87	14.60	89.47	10.95	5.13	42.61
			20	74.90	14.57	89.47	11.89	5.14	7.12	78.55	14.63	93.18	14.38	5.37	22.94	80.30	14.64	94.94	15.65	5.48	41.21
			25	81.11	14.66	95.77	16.21	5.53	6.60	84.42	14.71	99.13	18.96	5.74	21.96	85.91	14.73	100.64	20.35	5.83	39.51
			30	85.36	14.70	100.06	20.75	5.81	6.27	88.26	14.75	103.01	23.69	5.98	21.27	89.54	14.77	104.31	25.15	6.06	38.40
40	2.21	5.60	10	Operation Not Recommended						53.64	18.22	71.86	6.16	2.94	24.75	55.47	18.29	73.76	7.00	3.03	44.82
			15	59.15	18.42	77.57	8.59	3.21	7.58	63.12	18.55	81.67	10.49	3.40	23.72	65.11	18.62	83.73	11.47	3.50	42.61
			20	66.44	18.66	85.10	12.80	3.56	7.12	70.31	18.79	89.10	14.97	3.74	22.94	72.12	18.85	90.97	16.09	3.83	41.21
			25	73.52	18.90	92.42	17.04	3.89	6.60	75.56	18.90	94.46	19.60	4.00	21.96	77.16	18.96	96.12	20.82	4.07	39.51
			30	Operation Not Recommended																	
	3.34	19.53	10	Operation Not Recommended						56.30	17.46	73.76	5.97	3.22	24.75	58.13	17.50	75.63	6.85	3.32	44.82
			15	61.39	17.57	78.96	8.35	3.49	7.58	65.26	17.65	82.91	10.33	3.70	23.72	67.21	17.69	84.90	11.36	3.80	42.61
			20	68.21	17.68	85.89	12.61	3.86	7.12	72.13	17.77	89.90	14.84	4.06	22.94	74.01	17.81	91.82	15.99	4.16	41.21
			25	75.39	17.84	93.23	16.83	4.23	6.60	78.96	17.92	96.88	19.35	4.41	21.96	80.57	17.96	98.53	20.64	4.49	39.51
			30	80.39	17.93	98.32	21.29	4.48	6.27	77.06	17.83	94.89	24.49	4.32	21.27	78.88	17.88	96.76	25.73	4.41	38.40
	4.42	36.32	10	Operation Not Recommended																	
			15	62.45	17.18	79.63	8.24	3.64	7.58	66.33	17.23	83.56	10.26	3.85	23.72	68.28	17.26	85.54	11.30	3.96	42.61
			20	69.15	17.25	86.40	12.51	4.01	7.12	73.06	17.31	90.37	14.77	4.22	22.94	74.98	17.34	92.32	15.94	4.32	41.21
			25	76.30	17.37	93.67	16.74	4.39	6.60	80.01	17.42	97.43	19.28	4.59	21.96	81.73	17.46	99.19	20.57	4.68	39.51
			30	81.52	17.42	98.94	21.17	4.68	6.27	84.83	17.48	102.31	23.93	4.85	21.27	86.31	17.51	103.82	25.33	4.93	38.40

LEGEND

EER — Energy Efficiency Ratio
EWT — Entering Water Temperature (C)
HR — Heat of Rejection (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

HEATING CAPACITIES
50PSW036

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 0.28 l/s						Flow 0.43 l/s						Flow 0.57 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
-5	0.57	51.7	15	6.94	1.26	5.68	22.11	5.50	3.5	6.97	1.19	5.78	31.89	5.86	9.0	7.05	1.16	5.88	18.89	6.05	17.2
			25	6.86	1.48	5.39	31.44	4.65	2.8	6.91	1.46	5.45	29.33	4.74	8.3	6.94	1.44	5.51	28.28	4.84	15.9
			30	6.85	1.57	5.28	36.67	4.35	2.8	6.86	1.54	5.32	34.28	4.45	8.3	6.89	1.53	5.36	33.22	4.52	15.2
			35	6.70	1.97	4.74	41.28	3.41	2.1	6.73	1.86	4.87	39.17	3.62	7.6	6.76	1.81	4.94	38.17	3.73	15.2
0	0.28	11.7	15	7.33	1.25	6.08	22.44	5.85	3.5	7.36	1.19	6.17	12.44	6.19	9.0	7.39	1.16	6.23	19.03	6.39	17.2
			25	7.12	1.51	5.62	31.78	4.72	2.8	7.18	1.39	5.79	28.39	5.18	8.3	7.18	1.34	5.83	27.33	5.34	15.9
			30	7.07	1.70	5.37	36.72	4.17	2.8	7.15	1.61	5.54	34.50	4.45	8.3	7.20	1.57	5.64	33.39	4.60	15.2
			35	6.97	1.93	5.04	41.67	3.62	2.1	7.05	1.82	5.23	39.39	3.87	7.6	7.07	1.77	5.30	38.33	3.99	15.2
			45	6.86	2.41	4.45	51.44	2.85	1.4	6.89	2.28	4.61	49.28	3.02	7.6	6.86	2.22	4.64	48.22	3.09	13.1
	0.43	28.3	15	7.48	1.26	6.22	22.72	5.92	3.5	7.73	1.20	6.53	20.39	6.46	9.0	7.76	1.16	6.59	19.17	6.66	17.2
			25	7.23	1.52	5.71	32.11	4.77	2.8	7.28	1.44	5.85	29.89	5.07	8.3	7.31	1.39	5.91	28.78	5.24	15.9
			30	7.15	1.70	5.45	36.89	4.21	2.8	7.18	1.61	5.57	34.50	4.47	8.3	7.20	1.57	5.64	33.39	4.60	15.2
			35	7.07	1.93	5.14	41.67	3.67	2.1	7.10	1.82	5.28	39.44	3.90	7.6	7.12	1.77	5.35	38.33	4.02	15.2
			45	6.89	2.41	4.48	51.44	2.86	1.4	6.91	2.28	4.63	49.28	3.03	7.6	6.94	2.22	4.72	48.22	3.12	13.1
	0.57	49.0	15	7.83	1.27	6.56	22.94	6.16	3.5	7.94	1.20	6.74	20.50	6.63	9.0	7.97	1.16	6.80	19.28	6.84	17.2
			25	7.70	1.57	6.13	32.22	4.89	2.8	7.76	1.48	6.27	29.83	5.23	8.3	7.78	1.45	6.33	28.67	5.36	15.9
			30	7.60	1.76	5.83	37.11	4.31	2.8	7.65	1.66	5.99	34.78	4.60	8.3	7.68	1.62	6.05	33.61	4.73	15.2
			35	7.49	1.98	5.51	42.06	3.78	2.1	7.52	1.88	5.64	39.67	4.00	7.6	7.55	1.83	5.72	38.56	4.13	15.2
			45	7.20	2.53	4.68	51.72	2.85	1.4	7.18	2.39	4.79	49.44	3.01	7.6	7.15	2.33	4.82	48.39	3.07	13.1
5	0.28	10.3	15	8.23	1.26	6.97	23.22	6.52	3.5	8.23	1.24	6.99	-0.50	6.65	9.0	8.25	1.20	7.06	19.49	6.90	17.2
			25	8.10	1.57	6.52	32.56	5.14	2.8	8.07	1.51	6.56	24.89	5.35	8.3	8.10	1.47	6.63	23.83	5.52	15.9
			30	7.94	1.76	6.18	37.44	4.50	2.8	8.02	1.43	6.59	35.00	5.62	8.3	8.04	1.39	6.65	33.78	5.77	15.2
			35	7.81	1.98	5.82	42.33	3.93	2.1	7.89	1.67	6.21	39.89	4.71	7.6	7.89	1.62	6.26	38.72	4.86	15.2
			45	7.65	2.53	5.12	52.17	3.03	1.4	7.70	1.96	5.74	49.78	3.93	7.6	7.68	1.91	5.77	48.61	4.02	13.1
	0.43	25.5	15	8.47	1.27	7.19	23.50	6.66	3.5	8.60	1.21	7.39	20.94	7.13	9.0	8.62	1.17	7.45	19.83	7.35	17.2
			25	8.28	1.57	6.71	32.78	5.26	2.8	8.39	1.49	6.89	30.22	5.62	8.3	8.41	1.45	6.96	28.94	5.80	15.9
			30	8.18	1.77	6.40	37.72	4.62	2.8	8.25	1.68	6.57	35.11	4.91	8.3	8.28	1.63	6.65	33.89	5.07	15.2
			35	8.07	1.99	6.08	42.56	4.05	2.1	8.12	1.90	6.22	40.06	4.27	7.6	8.12	1.84	6.29	38.78	4.42	15.2
			45	7.73	2.53	5.20	52.28	3.06	1.4	7.73	2.38	5.35	49.83	3.25	7.6	7.70	2.33	5.37	48.61	3.31	13.1
	0.57	44.8	15	8.65	1.27	7.38	23.67	6.81	3.5	8.78	1.21	7.58	21.00	7.28	9.0	8.81	1.17	7.63	19.72	7.51	17.2
			25	8.47	1.58	6.88	32.94	5.35	2.8	8.57	1.49	7.08	30.33	5.74	8.3	8.60	1.46	7.14	29.06	5.89	15.9
			30	8.36	1.77	6.59	37.83	4.72	2.8	8.44	1.67	6.77	35.28	5.04	8.3	8.44	1.63	6.81	34.00	5.17	15.2
			35	8.23	1.99	6.24	42.72	4.13	2.1	8.28	1.89	6.40	40.17	4.39	7.6	8.28	1.84	6.44	38.89	4.51	15.2
			45	7.86	2.53	5.33	52.39	3.10	1.4	7.86	2.39	5.47	49.89	3.28	7.6	7.86	2.34	5.52	48.72	3.36	13.1
10	0.28	9.0	15	9.44	1.28	8.16	24.44	7.38	3.5	9.60	1.21	8.39	21.50	7.96	9.0	9.65	1.17	8.48	20.11	8.23	17.2
			25	9.23	1.58	7.65	33.72	5.83	2.8	9.36	1.50	7.86	30.83	6.24	8.3	9.39	1.46	7.93	29.39	6.43	15.9
			30	9.12	1.77	7.35	38.56	5.15	2.8	9.23	1.68	7.55	35.72	5.49	8.3	9.23	1.63	7.60	34.33	5.65	15.2
			35	8.89	1.58	7.30	33.72	5.61	2.1	9.36	1.50	7.86	30.83	6.24	7.6	9.39	1.46	7.93	29.39	6.43	15.2
			45	8.60	2.53	6.06	53.06	3.39	1.4	8.62	2.39	6.23	50.39	3.60	7.6	8.60	2.34	6.26	49.06	3.68	13.1
			50	Operation Not Recommended						8.39	2.67	5.71	55.22	3.14	6.2	8.36	2.60	5.76	53.94	3.22	12.4
	0.43	23.4	15	9.81	1.28	8.53	24.89	7.67	3.5	10.33	1.21	9.12	22.00	8.51	9.0	10.38	1.18	9.20	20.44	8.79	17.2
			25	9.57	1.59	7.98	34.33	6.02	2.8	10.04	1.50	8.54	31.28	6.69	8.3	10.07	1.47	8.60	29.72	6.86	15.9
			30	9.44	1.78	7.66	38.83	5.30	2.8	9.86	1.69	8.17	36.17	5.84	8.3	9.88	1.64	8.24	34.67	6.03	15.2
			35	9.23	2.01	7.22	44.00	4.59	2.1	9.65	1.90	7.75	41.00	5.07	7.6	9.67	1.85	7.82	39.56	5.22	15.2
			45	8.89	2.54	6.34	53.56	3.50	1.4	9.15	2.41	6.74	50.72	3.79	7.6	9.15	2.35	6.80	49.33	3.90	13.1
			50	Operation Not Recommended						8.89	2.68	6.20	55.56	3.31	6.2	8.86	2.62	6.24	54.17	3.39	12.4
	0.57	41.4	15	10.15	1.28	8.87	25.11	7.93	3.5	10.33	1.21	9.12	21.72	8.51	9.0	10.38	1.18	9.20	20.44	8.79	17.2
			25	9.91	1.59	8.32	34.39	6.23	2.8	10.04	1.50	8.54	31.56	6.69	8.3	10.10	1.47	8.63	29.72	6.88	15.9
			30	9.75	1.78	7.97	39.17	5.48	2.8	9.88	1.69	8.20	36.17	5.85	8.3	9.88	1.64	8.24	34.67	6.03	15.2
			35	9.57	2.01	7.56	44.00	4.76	2.1	9.67	1.90	7.77	41.00	5.09	7.6	9.67	1.85	7.82	39.56	5.22	15.2
			45	9.12	2.54	6.58	53.56	3.59	1.4	9.15	2.41	6.74	50.72	3.79	7.6	9.15	2.35	6.80	49.33	3.90	13.1
			50	Operation Not Recommended						8.89	2.68	6.20	55.56	3.31	6.2	8.86	2.62	6.24	54.17	3.39	12.4
15	0.28	8.3	15	10.17	1.29	8.89	25.33	7.90	3.5	10.36	1.21	9.14	22.00	8.54	9.0	10.38	1.18	9.20	20.44	8.79	17.2
			25	10.07	1.59	8.48	34.50	6.33	2.8	10.23	1.50	8.73	31.39	6.82	8.3	10.25	1.47	8.79	29.83	6.99	15.9
			30	9.99	1.78	8.21	39.39	5.61	2.8	10.12	1.69	8.43	36.33	5.99	8.3	10.15	1.64	8.51	34.78	6.19	15.2
			35	9.86	2.01	7.85	44.28	4.91	2.1	9.96	1.89	8.07	41.22	5.26	7.6	9.99	1.85	8.15	39.72	5.41	15.2
			45	9.52	2.54	6.97	53.94	3.74	1.4	9.54	2.40	7.14	50.94	3.97	7.6	9.54	2.35	7.20	49.50	4.07	13.1
			50	Operation Not Recommended						9.31	2.68	6.63	55.78	3.47	6.2	9.28	2.62	6.66	54.39	3.55	12.4
	0.43	21.4	15	10.52	1.29	9.23	25.50	8.17	3.5	11.02	1.22	9.79	22.39	9.02	9.0	11.07	1.19	9.88	20.72	9.31	17.2
			25	10.38	1.60	8.79	35.06	6.49	2.8	10.88	1.51	9.38	31.78	7.21	8.3	10.91	1.48	9.43	30.11	7.39	15.9
			30	10.31	1.79	8.52	39.61	5.77	2.8	10.75	1.70	9.06	36.72	6.33	8.3	10.78	1.65	9.13	35.06	6.54	15.2
			35	10.17	2.02	8.16	44.83	5.04	2.1	10.57	1.90	8.67	41.61	5.56	7.6	10.59	1.85	8.74	40.00	5.72	15.2
			45	9.78	2.55	7.23	54.39	3.83	1.4	10.07	2.42	7.65	51.28	4.16	7.6	10.07	2.35	7.72	49.72	4.28	13.1
			50	Operation Not Recommended						9.81	2.69	7.12	56.06	3.65	6.2	9.78	2.62	7.16	54.61	3.73	12.4
	0.57	38.6	15	10.83	1.29	9.54	25.72	8.41	3.5	11.04	1.22	9.82	22.44	9.04	9.0	11.09	1.19	9.91	20.72	9.33	17.2
			25	10.70	1.60	9.10	35.22	6.69	2.8	10.88	1.51	9.38	31.78	7.21	8.3	10.91	1.48	9.43	30.11	7.39	15.9
			30	10.59	1.79	8.81	39.94	5.93	2.8	10.75	1.70	9.06	36.72	6.33	8.3	10.78	1.65	9.13	35.06	6.54	15.2
			35	10.46	2.02	8.45	44.83	5.19	2.1	10.57	1.90	8.67	41.61	5.56	7.6	10.59	1.85	8.74	40.00	5.72	15.2
			45	10.02	2.55	7.47	54.39	3.93	1.4	10.10	2.42	7.68	51.28	4.17	7.6	10.10	2.35	7.74	49.72	4.29	13.1
			50	Operation Not Recommended						9.81	2.70	7.11	56.06	3.63	6.2	9.78	2.62	7.16	54.61	3.73	12.4

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

HEATING CAPACITIES (cont)

50PSW036 (cont)

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 0.28 l/s						Flow 0.43 l/s						Flow 0.57 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
20	0.28	6.9	15	11.02	1.30	9.72	25.78	8.50	3.5	11.09	1.22	9.87	22.50	9.08	9.0	11.15	1.19	9.96	20.83	9.37	17.2
			25	10.94	1.60	9.34	35.28	6.84	2.8	11.12	1.51	9.61	31.89	7.37	8.3	11.15	1.48	9.67	30.22	7.55	15.9
			30	10.88	1.79	9.10	40.22	6.09	2.8	11.04	1.70	9.34	36.89	6.51	8.3	11.07	1.65	9.42	35.22	6.72	15.2
			35	10.81	2.02	8.79	45.17	5.36	2.1	10.94	1.90	9.03	41.83	5.75	7.6	10.96	1.85	9.11	40.17	5.92	15.2
			45	10.44	2.55	7.89	54.78	4.09	1.4	10.52	2.42	8.10	51.56	4.35	7.6	10.52	2.35	8.16	49.94	4.47	13.1
			50	Operation Not Recommended						10.25	2.69	7.56	56.39	3.81	6.2	10.23	2.62	7.60	54.83	3.90	12.4
	0.43	19.3	15	11.25	1.30	9.96	26.11	8.68	3.5	11.73	1.23	10.50	22.83	9.53	9.0	11.78	1.20	10.58	21.11	9.84	17.2
			25	11.23	1.61	9.62	35.61	6.98	2.8	11.70	1.52	10.18	32.28	7.71	8.3	11.75	1.48	10.28	30.50	7.96	15.9
			30	11.15	1.80	9.35	40.44	6.21	2.8	11.62	1.70	9.92	37.22	6.85	8.3	11.67	1.66	10.02	35.50	7.05	15.2
			35	11.07	2.03	9.04	45.67	5.46	2.1	11.49	1.91	9.58	42.17	6.01	7.6	11.51	1.86	9.65	40.39	6.19	15.2
			45	10.91	2.57	8.34	55.28	4.25	1.4	10.99	2.43	8.56	51.83	4.53	7.6	10.99	2.36	8.63	50.17	4.65	13.1
			50	Operation Not Recommended						10.70	2.71	7.99	56.67	3.95	6.2	10.70	2.63	8.07	55.00	4.06	12.4
	0.57	35.2	15	11.86	1.30	10.56	26.33	9.15	3.5	11.75	1.23	10.52	22.83	9.55	9.0	11.78	1.20	10.58	21.11	9.84	17.2
			25	11.51	1.62	9.90	35.83	7.13	2.8	11.70	1.52	10.18	32.28	7.71	8.3	11.75	1.48	10.28	30.50	7.96	15.9
			30	11.46	1.80	9.67	40.78	6.38	2.8	11.65	1.70	9.95	37.22	6.86	8.3	11.67	1.66	10.02	35.50	7.05	15.2
			35	11.36	2.03	9.33	45.67	5.61	2.1	11.49	1.91	9.58	42.17	6.01	7.6	11.51	1.86	9.65	40.39	6.19	15.2
			45	11.15	2.57	8.58	55.28	4.34	1.4	11.02	2.43	8.59	51.83	4.54	7.6	11.02	2.36	8.65	50.17	4.66	13.1
			50	Operation Not Recommended						10.70	2.71	7.99	56.67	3.95	6.2	10.70	2.63	8.07	55.00	4.06	12.4
25	0.28	6.2	15	12.01	1.30	10.71	26.50	9.21	3.5	11.96	1.23	10.73	22.94	9.73	9.0	11.94	1.20	10.74	21.17	9.97	17.2
			25	11.94	1.62	10.32	36.06	7.39	2.8	12.04	1.52	10.52	32.44	7.94	8.3	12.07	1.48	10.59	30.67	8.18	15.9
			30	11.83	1.80	10.03	41.11	6.59	2.8	11.99	1.70	10.29	37.44	7.06	8.3	12.04	1.66	10.38	35.67	7.27	15.2
			35	11.75	2.03	9.73	46.06	5.80	2.1	11.91	1.91	10.00	42.44	6.23	7.6	11.94	1.86	10.07	40.61	6.41	15.2
			45	11.38	2.56	8.82	55.67	4.45	1.4	11.46	2.43	9.04	52.17	4.72	7.6	11.49	2.36	9.13	50.39	4.86	13.1
			50							10.67	2.70	7.98	56.67	3.96	6.2	10.65	2.63	8.02	55.00	4.05	12.4
	0.43	18.6	15	12.09	1.30	10.79	26.78	9.28	3.5	12.41	1.24	11.17	23.28	10.02	9.0	12.46	1.21	11.26	21.39	10.34	17.2
			25	12.33	1.62	10.71	36.28	7.59	2.8	12.54	1.53	11.01	32.83	8.22	8.3	12.59	1.48	11.11	30.89	8.48	15.9
			30	12.30	1.80	10.50	41.28	6.82	2.8	12.51	1.71	10.81	37.78	7.34	8.3	12.57	1.66	10.90	35.89	7.55	15.2
			35	12.22	2.03	10.20	46.50	6.04	2.1	12.41	1.92	10.49	42.72	6.47	7.6	12.43	1.87	10.57	40.83	6.65	15.2
			45	11.80	2.57	9.23	56.11	4.58	1.4	11.94	2.44	9.50	52.39	4.90	7.6	11.94	2.37	9.57	50.61	5.04	13.1
			50	Operation Not Recommended						11.67	2.67	9.01	56.5	4.38	6.2	11.67	2.60	9.07	54.72	4.49	12.4
	0.57	33.8	15	12.17	1.30	10.87	27.00	9.34	3.5	12.41	1.24	11.17	23.28	10.02	9.0	12.46	1.21	11.26	21.39	10.34	17.2
			25	12.33	1.62	10.71	36.56	7.59	2.8	12.54	1.53	11.01	32.83	8.22	8.3	12.59	1.48	11.11	30.89	8.48	15.9
			30	12.30	1.80	10.50	41.56	6.82	2.8	12.51	1.71	10.81	37.78	7.34	8.3	12.57	1.66	10.90	35.89	7.55	15.2
			35	12.22	2.03	10.20	46.50	6.04	2.1	12.41	1.92	10.49	42.72	6.47	7.6	12.43	1.87	10.57	40.83	6.65	15.2
			45	11.80	2.57	9.23	56.11	4.58	1.4	11.94	2.44	9.50	52.39	4.90	7.6	11.94	2.37	9.57	50.61	5.04	13.1

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

HEATING CAPACITIES (cont)

50PSW060

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 0.47 l/s						Flow 0.71 l/s						Flow 0.95 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
-5	0.95	49.6	15	12.43	2.24	10.2	19.44	5.55	9.7	12.43	2.23	10.20	19.25	5.59	24.1	12.43	2.21	10.20	19.06	5.62	41.4
			25	12.41	2.76	9.7	28.89	4.50	8.3	12.40	2.74	9.70	28.69	4.52	22.8	12.38	2.73	9.70	28.50	4.53	39.3
			30	12.30	3.08	9.2	33.83	3.99	8.3	12.30	3.07	9.20	33.64	4.01	22.1	12.30	3.06	9.20	33.44	4.02	37.9
			35	12.12	3.49	8.6	38.78	3.48	8.3	12.11	3.47	8.60	38.58	3.49	21.4	12.09	3.45	8.60	38.39	3.50	37.2
0	0.47	10.3	15	13.57	2.26	11.3	20.28	5.99	9.7	13.33	2.23	11.10	19.78	5.97	24.1	13.09	2.21	10.90	19.28	5.94	41.4
			25	13.59	2.78	10.8	29.72	4.89	8.3	13.37	2.75	10.60	29.22	4.87	22.8	13.14	2.71	10.40	28.72	4.84	39.3
			30	13.49	3.12	10.4	34.67	4.33	8.3	13.29	3.08	10.20	34.17	4.32	22.1	13.09	3.04	10.10	33.67	4.30	37.9
			35	13.33	3.52	9.8	39.61	3.79	8.3	13.14	3.47	9.70	39.14	3.79	21.4	12.96	3.43	9.50	38.67	3.78	37.2
			45	12.62	4.51	8.1	49.72	2.80	7.6	12.57	4.45	8.10	49.14	2.82	17.2	12.51	4.39	8.10	48.56	2.85	35.9
	0.71	27.6	15	14.70	2.28	12.4	21.11	6.45	9.7	14.70	2.25	12.40	20.42	6.54	24.1	14.70	2.21	12.50	19.72	6.64	41.4
			25	14.75	2.80	11.9	30.56	5.26	8.3	14.74	2.77	12.00	29.86	5.32	22.8	14.72	2.73	12.00	29.17	5.39	39.3
			30	14.67	3.14	11.5	35.50	4.67	8.3	14.66	3.10	11.60	34.81	4.73	22.1	14.64	3.06	11.60	34.11	4.79	37.9
			35	14.51	3.54	11.0	40.44	4.10	8.3	14.49	3.49	11.00	39.75	4.15	21.4	14.46	3.44	11.00	39.06	4.20	37.2
			45	13.96	4.53	9.4	50.22	3.08	7.6	13.91	4.46	9.40	49.56	3.11	17.2	13.85	4.40	9.50	48.89	3.15	35.9
	0.95	47.6	15	14.01	2.29	11.7	20.78	6.12	9.7	14.01	2.26	11.80	20.14	6.21	24.1	14.01	2.22	11.80	19.50	6.31	41.4
			25	14.01	2.83	11.2	30.22	4.95	8.3	14.00	2.79	11.20	29.58	5.02	22.8	13.99	2.75	11.20	28.94	5.09	39.3
			30	13.91	3.17	10.7	35.22	4.39	8.3	13.89	3.12	10.80	34.56	4.45	22.1	13.88	3.08	10.80	33.89	4.50	37.9
			35	13.72	3.57	10.2	40.17	3.85	8.3	13.70	3.52	10.20	39.50	3.89	21.4	13.67	3.47	10.20	38.83	3.94	37.2
			45	13.09	4.54	8.5	49.94	2.88	7.6	13.04	4.48	8.60	49.31	2.91	17.2	12.99	4.42	8.60	48.67	2.94	35.9
5	0.47	9.7	15	14.67	2.28	12.4	21.06	6.44	9.7	14.67	2.25	12.40	20.36	6.53	24.1	14.67	2.21	12.50	19.67	6.63	41.4
			25	14.75	2.80	11.9	30.56	5.26	8.3	14.74	2.77	12.00	29.86	5.32	22.8	14.72	2.73	12.00	29.17	5.39	39.3
			30	14.70	3.14	11.6	35.56	4.68	8.3	14.68	3.10	11.60	34.83	4.74	22.1	14.67	3.06	11.60	34.11	4.80	37.9
			35	14.59	3.54	11.0	40.50	4.12	8.3	14.56	3.49	11.10	39.78	4.17	21.4	14.54	3.44	11.10	39.06	4.22	37.2
			45	14.14	4.52	9.6	50.33	3.13	7.6	14.09	4.46	9.60	49.64	3.16	17.2	14.04	4.40	9.60	48.94	3.19	35.9
	0.71	25.5	15	16.96	2.29	14.7	21.94	7.41	9.7	16.96	2.26	14.70	21.14	7.52	24.1	16.96	2.22	14.70	20.33	7.63	41.4
			25	17.04	2.83	14.2	31.39	6.02	8.3	17.02	2.79	14.20	30.58	6.11	22.8	17.01	2.75	14.30	29.78	6.19	39.3
			30	16.93	3.17	13.8	36.33	5.35	8.3	16.92	3.12	13.80	35.56	5.42	22.1	16.90	3.08	13.80	34.78	5.50	37.9
			35	16.75	3.57	13.2	41.28	4.69	8.3	16.73	3.52	13.20	40.50	4.76	21.4	16.72	3.47	13.30	39.72	4.82	37.2
			45	16.09	4.54	11.5	51.06	3.54	7.6	16.05	4.48	11.60	50.28	3.58	17.2	16.01	4.41	11.60	49.50	3.63	35.9
	0.95	44.8	15	15.67	2.30	13.4	21.44	6.82	9.7	15.67	2.26	13.40	20.69	6.92	24.1	15.67	2.23	13.40	19.94	7.03	41.4
			25	15.67	2.85	12.8	30.89	5.51	8.3	15.66	2.81	12.80	30.14	5.57	22.8	15.64	2.77	12.90	29.39	5.64	39.3
			30	15.56	3.18	12.4	35.83	4.89	8.3	15.55	3.14	12.40	35.11	4.95	22.1	15.54	3.10	12.40	34.39	5.01	37.9
			35	15.35	3.58	11.8	40.78	4.28	8.3	15.33	3.53	11.80	40.06	4.34	21.4	15.30	3.49	11.80	39.33	4.39	37.2
			45	14.64	4.55	10.1	50.50	3.22	7.6	14.60	4.49	10.10	49.81	3.25	17.2	14.56	4.43	10.10	49.11	3.29	35.9
10	0.47	9.0	15	16.19	2.28	13.9	21.61	7.1	9.7	16.19	2.25	13.90	20.86	7.19	24.1	16.19	2.22	14.00	20.11	7.29	41.4
			25	16.33	2.81	13.5	31.11	5.80	8.3	16.31	2.78	13.50	30.36	5.88	22.8	16.30	2.74	13.60	29.61	5.95	39.3
			30	16.27	3.15	13.1	36.11	5.17	8.3	16.26	3.11	13.20	35.33	5.23	22.1	16.25	3.07	13.20	34.56	5.30	37.9
			35	16.14	3.55	12.6	41.06	4.55	8.3	16.12	3.50	12.60	40.31	4.60	21.4	16.09	3.45	12.60	39.56	4.66	37.2
			45	15.67	4.53	11.1	50.83	3.46	7.6	15.62	4.47	11.10	50.11	3.49	17.2	15.56	4.41	11.20	49.39	3.53	35.9
			50	Operation Not Recommended						15.38	5.08	10.30	55.78	3.03	19.3	15.27	4.94	10.30	54.33	3.09	35.2
	0.71	23.4	15	17.98	2.30	15.7	22.33	7.80	9.7	18.00	2.30	15.70	22.00	7.84	24.1	18.01	2.23	15.80	20.61	8.07	41.4
			25	17.98	2.86	15.1	31.78	6.28	8.3	18.00	2.84	15.20	31.44	6.34	22.8	18.01	2.78	15.20	30.06	6.48	39.3
			30	17.88	3.21	14.7	36.72	5.58	8.3	17.88	3.18	14.70	36.39	5.62	22.1	17.88	3.12	14.80	35.00	5.74	37.9
			35	17.67	3.61	14.1	41.61	4.90	8.3	17.65	3.58	14.10	41.33	4.93	21.4	17.64	3.51	14.10	39.94	5.03	37.2
			45	16.83	4.57	12.3	51.28	3.68	7.6	16.79	4.55	12.20	51.11	3.69	17.2	16.75	4.44	12.30	49.72	3.77	35.9
			50	Operation Not Recommended						16.3	5.08	11.20	55.94	3.21	19.3	16.22	4.94	11.30	54.56	3.29	35.2
	0.95	42.7	15	17.98	2.30	15.7	22.33	7.80	9.7	18.00	2.30	15.70	22.33	7.81	24.1	18.01	2.24	15.80	20.61	8.04	41.4
			25	18.01	2.86	15.1	31.78	6.29	8.3	18.01	2.86	15.10	31.78	6.29	22.8	18.01	2.78	15.20	30.06	6.48	39.3
			30	17.90	3.21	14.7	36.72	5.58	8.3	17.89	3.16	14.70	36.72	5.66	22.1	17.88	3.12	14.80	35.00	5.74	37.9
			35	17.67	3.61	14.1	41.61	4.90	8.3	17.65	3.61	14.00	41.61	4.89	21.4	17.64	3.51	14.10	40.00	5.03	37.2
			45	16.83	4.57	12.3	51.28	3.68	7.6	16.80	4.57	12.20	51.28	3.68	17.2	16.77	4.44	12.30	49.72	3.78	35.9
			50	Operation Not Recommended						16.30	5.08	11.20	56.11	3.21	19.3	16.22	4.94	11.30	54.56	3.29	35.2
15	0.47	8.3	15	16.93	2.30	14.6	21.89	7.35	9.7	16.93	2.28	14.70	21.11	7.44	24.1	16.93	2.25	14.70	20.33	7.54	41.4
			25	17.19	2.82	14.4	31.44	6.10	8.3	17.19	2.78	14.40	30.64	6.19	22.8	17.19	2.74	14.50	29.83	6.28	39.3
			30	17.22	3.15	14.1	36.44	5.47	8.3	17.21	3.10	14.10	35.64	5.54	22.1	17.19	3.06	14.10	34.83	5.62	37.9
			35	17.19	3.54	13.7	41.44	4.85	8.3	17.17	3.49	13.70	40.64	4.91	21.4	17.14	3.44	13.70	39.83	4.98	37.2
			45	17.01	4.53	12.5	51.39	3.76	7.6	16.98	4.46	12.50	50.58	3.80	17.2	16.96	4.40	12.60	49.78	3.85	35.9
			50	Operation Not Recommended						16.92	5.07	11.90	56.39	1.66	19.3	16.83	4.94	11.90	54.72	3.41	35.2
	0.71	22.1	15	18.90	2.33	16.6	22.67	8.12	9.7	18.92	2.30	16.60	21.78	8.24	24.1	18.93	2.26	16.70	20.89	8.36	41.4
			25	19.09	2.88	16.2	32.17	6.63	8.3	19.07	2.84	16.20	31.28	6.72	22.8	19.06	2.80	16.30	30.39	6.82	39.3
			30	19.06	3.22	15.8	37.17	5.91	8.3	19.05	3.18	15.90	36.28	5.99	22.1	19.03	3.13	15.90	35.39	6.08	37.9
			35	18.93	3.62	15.3	42.11	5.23	8.3	18.93	3.57	15.40	41.22	5.31	21.4	18.93	3.52	15.40	40.33	5.38	37.2
			45	18.40	4.58	13.8	51.89	4.02	7.6	18.38	4.51	13.90	51.03	4.07	17.2	18.35	4.45	13.90	50.17	4.12	35.9
			50	Operation Not Recommended						18.20	4.99	13.20	55.83	1.80	19.3	17.98	4.96	13.00	55.06	3.62	35.2
	0.95	40.0	15	18.93	2.33	16.6	22.67	8.13	9.7	18.94	2.30	16.60	21.78	8.25	24.1	18.95	2.26	16.70	20.89	8.38	41.4
			25	19.09	2.88	16.2	32.17	6.63	8.3	19.09	2.84	16.20	31.28	6.73	22.8	19.09	2.80	16.30	30.39	6.83	39.3
			30	19.06	3.22	15.8	37.17	5.91	8.3	19.06	3.18	15.90	36.28	6.00	22.1	19.06	3.13	15.90	35.39	6.08	37.9
			35	18.95	3.62	15.3	42.11	5.24	8.3	18.94	3.57	15.40	41.22	5.31	21.4	18.93	3.52	15.40	40.33	5.38	37.2
			45	18.43	4.58	13.9	51.94	4.03	7.6	18.39	4.51	13.90	51.06	4.07	17.2	18.35	4.45	13.90	50.17	4.12	35.9
			50	Operation Not Recommended												18.01	4.96	13.00	55.06	3.63	35.2

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

HEATING CAPACITIES (cont)

50PSW060 (cont)

SOURCE			LOAD																	
EWT C	Flow		EWT C	Flow 0.47 l/s						Flow 0.71 l/s						Flow 0.95 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
20	0.47	7.6	15	17.67	2.32	15.3	22.22	7.61	9.7	17.7	2.29	15.4	21.39	7.71	24.1	17.69	2.26	15.4	20.56	7.82	41.4
			25	18.03	2.82	15.2	31.78	6.39	8.3	18.0	2.78	15.3	30.94	6.48	22.8	18.03	2.75	15.3	30.11	6.57	39.3
			30	18.17	3.14	15.0	36.83	5.78	8.3	18.2	3.10	15.1	35.97	5.86	22.1	18.14	3.06	15.1	35.11	5.93	37.9
			35	18.24	3.53	14.7	41.83	5.16	8.3	18.2	3.49	14.7	40.97	5.23	21.4	18.22	3.44	14.8	40.11	5.30	37.2
			45	18.38	4.52	13.9	51.89	4.07	7.6	18.4	4.46	13.9	51.03	4.12	17.2	18.32	4.40	13.9	50.17	4.17	35.9
			50	Operation Not Recommended												18.38	4.93	13.4	55.17	3.73	35.2
	0.71	20.7	15	18.77	2.33	16.4	22.61	8.06	9.7	18.8	2.30	16.5	21.72	8.17	24.1	18.80	2.27	16.5	20.83	8.28	41.4
			25	19.09	2.85	16.2	32.17	6.69	8.3	19.1	2.82	16.3	31.28	6.78	22.8	19.11	2.78	16.3	30.39	6.88	39.3
			30	19.19	3.19	16.0	37.22	6.02	8.3	19.2	3.14	16.0	36.31	6.10	22.1	19.19	3.10	16.1	35.39	6.19	37.9
			35	19.24	3.58	15.7	42.22	5.37	8.3	19.2	3.53	15.7	41.33	5.44	21.4	19.22	3.49	15.7	40.44	5.51	37.2
			45	19.19	4.56	14.6	52.22	4.21	7.6	19.2	4.50	14.7	51.31	4.26	17.2	19.14	4.44	14.7	50.39	4.31	35.9
			50	Operation Not Recommended												19.09	4.95	14.1	55.39	3.85	35.2
	0.95	37.9	15	19.87	2.35	17.5	23.06	8.47	9.7	19.9	2.31	17.6	22.11	8.60	24.1	19.90	2.28	17.6	21.17	8.73	41.4
			25	20.16	2.89	17.3	32.56	6.99	8.3	20.2	2.85	17.3	31.64	7.09	22.8	20.16	2.80	17.4	30.72	7.19	39.3
			30	20.22	3.23	17.0	37.61	6.26	8.3	20.2	3.19	17.0	36.67	6.35	22.1	20.22	3.14	17.1	35.72	6.44	37.9
			35	20.24	3.63	16.6	42.61	5.57	8.3	20.2	3.58	16.6	41.67	5.65	21.4	20.22	3.53	16.7	40.72	5.72	37.2
			45	20.03	4.59	15.4	52.50	4.36	7.6	20.0	4.53	15.5	51.56	4.42	17.2	19.98	4.47	15.5	50.61	4.47	35.9
			50	Operation Not Recommended												19.80	4.98	14.8	55.61	3.98	35.2
25	0.47	6.9	15	18.40	2.35	16.1	22.44	7.85	9.7	18.4	2.31	16.1	21.61	7.96	24.1	18.43	2.28	16.1	20.78	8.08	41.4
			25	18.90	2.82	16.1	32.11	6.70	8.3	18.9	2.78	16.1	31.22	6.79	22.8	18.90	2.75	16.2	30.33	6.88	39.3
			30	19.11	3.14	16.0	37.17	6.09	8.3	19.1	3.10	16.0	36.28	6.17	22.1	19.11	3.06	16.1	35.39	6.25	37.9
			35	19.30	3.53	15.8	42.28	5.47	8.3	19.3	3.48	15.8	41.36	5.55	21.4	19.27	3.43	15.8	40.44	5.62	37.2
			45	19.74	4.51	15.2	52.44	4.38	7.6	19.7	4.45	15.3	51.50	4.43	17.2	19.66	4.39	15.3	50.56	4.48	35.9
			50	Operation Not Recommended												19.93	4.92	15.0	55.61	4.05	35.2
	0.71	20.0	15	19.61	2.35	17.3	22.94	8.33	9.7	19.6	2.32	17.3	22.00	8.46	24.1	19.64	2.29	17.4	21.06	8.58	41.4
			25	20.06	2.86	17.2	32.50	7.01	8.3	20.1	2.82	17.3	31.58	7.12	22.8	20.09	2.78	17.3	30.67	7.23	39.3
			30	20.27	3.19	17.1	37.61	6.35	8.3	20.3	3.14	17.1	36.67	6.44	22.1	20.24	3.10	17.1	35.72	6.53	37.9
			35	20.37	3.58	16.8	42.72	5.69	8.3	20.4	3.53	16.9	41.75	5.77	21.4	20.40	3.49	16.9	40.78	5.85	37.2
			45	20.69	4.56	16.1	52.78	4.54	7.6	20.7	4.50	16.2	51.81	4.59	17.2	20.64	4.44	16.2	50.83	4.65	35.9
			50	Operation Not Recommended												21.58	4.96	16.6	55.83	4.35	35.2
	0.95	37.2	15	20.82	2.36	18.5	23.39	8.82	9.7	20.8	2.33	18.5	22.39	8.95	24.1	20.85	2.30	18.6	21.39	9.08	41.4
			25	21.22	2.90	18.3	32.94	7.31	8.3	21.2	2.86	18.4	31.97	7.42	22.8	21.24	2.82	18.4	31.00	7.53	39.3
			30	21.40	3.24	18.2	38.06	6.61	8.3	21.4	3.19	18.2	37.06	6.70	22.1	21.37	3.15	18.2	36.06	6.79	37.9
			35	21.50	3.64	17.9	43.11	5.91	8.3	21.5	3.59	17.9	42.08	5.99	21.4	21.50	3.54	18.0	41.06	6.07	37.2
			45	21.64	4.61	17.0	53.11	4.69	7.6	21.6	4.55	17.1	52.08	4.75	17.2	21.58	4.49	17.1	51.06	4.81	35.9

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

HEATING CAPACITIES (cont)

50PSW120

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 0.95 l/s						Flow 1.42 l/s						Flow 1.89 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
-5	1.89	54.5	15	24.87	4.48	20.39	19.44	5.55	10.3	24.87	4.45	20.42	19.25	5.59	25.5	24.87	4.43	20.44	19.06	5.62	45.5
			25	24.82	5.51	19.31	28.89	4.50	9.7	24.79	5.49	19.31	28.69	4.52	23.4	24.76	5.46	19.30	28.50	4.53	42.7
			30	24.61	6.17	18.44	33.83	3.99	9.7	24.61	6.14	18.47	33.64	4.01	22.8	24.61	6.12	18.49	33.44	4.02	42.1
			35	24.24	6.97	17.27	38.78	3.48	9.0	24.21	6.94	17.28	38.58	3.49	22.8	24.19	6.90	17.28	38.39	3.50	40.7
0	0.95	11.7	15	27.13	4.53	22.60	20.28	5.99	10.3	26.66	4.47	22.19	19.78	5.97	25.5	26.18	4.41	21.77	19.28	5.94	45.5
			25	27.18	5.56	21.62	29.72	4.89	9.7	26.74	5.49	21.24	29.22	4.87	23.4	26.29	5.43	20.86	28.72	4.84	42.7
			30	26.97	6.23	20.74	34.67	4.33	9.7	26.58	6.16	20.42	34.17	4.32	22.8	26.18	6.08	20.10	33.67	4.30	42.1
			35	26.66	7.04	19.62	39.61	3.79	9.0	26.29	6.95	19.34	39.14	3.79	22.8	25.92	6.86	19.07	38.67	3.78	40.7
			45	25.24	9.02	16.22	49.72	2.80	8.3	25.13	8.90	16.24	49.14	2.82	21.4	25.03	8.77	16.25	48.56	2.85	39.3
	1.42	30.3	15	29.39	4.56	24.83	21.11	6.45	10.3	29.39	4.49	24.90	20.42	6.54	25.5	29.39	4.43	24.96	19.72	6.64	45.5
			25	29.50	5.61	23.89	30.56	5.26	9.7	29.47	5.54	23.94	29.86	5.32	23.4	29.44	5.46	23.98	29.17	5.39	42.7
			30	29.34	6.28	23.06	35.50	4.67	9.7	29.31	6.20	23.11	34.81	4.73	22.8	29.29	6.12	23.17	34.11	4.79	42.1
			35	29.02	7.08	21.94	40.44	4.10	9.0	28.97	6.99	21.98	39.75	4.15	22.8	28.92	6.89	22.03	39.06	4.20	40.7
			45	27.92	9.05	18.87	50.22	3.08	8.3	27.81	8.93	18.88	49.56	3.11	21.4	27.71	8.81	18.90	48.89	3.15	39.3
	1.89	52.4	15	28.02	4.58	23.45	20.78	6.12	10.3	28.02	4.51	23.51	20.14	6.21	25.5	28.02	4.44	23.58	19.50	6.31	45.5
			25	28.02	5.66	22.37	30.22	4.95	9.7	28.00	5.58	22.42	29.58	5.02	23.4	27.97	5.49	22.48	28.94	5.09	42.7
			30	27.81	6.33	21.48	35.22	4.39	9.7	27.79	6.25	21.54	34.56	4.45	22.8	27.76	6.17	21.60	33.89	4.50	42.1
			35	27.45	7.13	20.31	40.17	3.85	9.0	27.39	7.04	20.36	39.50	3.89	22.8	27.34	6.94	20.40	38.83	3.94	40.7
			45	26.18	9.09	17.10	49.94	2.88	8.3	26.08	8.96	17.12	49.31	2.91	21.4	25.97	8.84	17.13	48.67	2.94	39.3
5	0.95	10.3	15	29.34	4.56	24.78	21.06	6.44	10.3	29.34	4.49	24.85	20.36	6.53	25.5	29.34	4.43	24.91	19.67	6.63	45.5
			25	29.50	5.61	23.89	30.56	5.26	9.7	29.47	5.54	23.94	29.86	5.32	23.4	29.44	5.46	23.98	29.17	5.39	42.7
			30	29.39	6.28	23.11	35.56	4.68	9.7	29.37	6.20	23.17	34.83	4.74	22.8	29.34	6.12	23.22	34.11	4.80	42.1
			35	29.18	7.08	22.10	40.50	4.12	9.0	29.13	6.99	22.14	39.78	4.17	22.8	29.08	6.89	22.19	39.06	4.22	40.7
			45	28.29	9.04	19.25	50.33	3.13	8.3	28.18	8.91	19.27	49.64	3.16	21.4	28.08	8.79	19.29	48.94	3.19	39.3
	1.42	27.6	15	33.91	4.58	29.34	21.94	7.41	10.3	33.91	4.51	29.40	21.14	7.52	25.5	33.91	4.44	29.47	20.33	7.63	45.5
			25	34.07	5.66	28.41	31.39	6.02	9.7	34.05	5.58	28.47	30.58	6.11	23.4	34.02	5.49	28.52	29.78	6.19	42.7
			30	33.86	6.33	27.53	36.33	5.35	9.7	33.83	6.24	27.59	35.56	5.42	22.8	33.81	6.15	27.66	34.78	5.50	42.1
			35	33.49	7.13	26.36	41.28	4.69	9.0	33.47	7.04	26.43	40.50	4.76	22.8	33.44	6.94	26.50	39.72	4.82	40.7
			45	32.18	9.09	23.09	51.06	3.54	8.3	32.10	8.95	23.15	50.28	3.58	21.4	32.02	8.82	23.20	49.50	3.63	39.3
	1.89	49.6	15	31.34	4.59	26.75	21.44	6.82	10.3	31.34	4.53	26.81	20.69	6.92	25.5	31.34	4.46	26.88	19.94	7.03	45.5
			25	31.34	5.69	25.65	30.89	5.51	9.7	31.31	5.62	25.69	30.14	5.57	23.4	31.28	5.54	25.74	29.39	5.64	42.7
			30	31.13	6.36	24.76	35.83	4.89	9.7	31.10	6.28	24.82	35.11	4.95	22.8	31.07	6.20	24.88	34.39	5.01	42.1
			35	30.71	7.17	23.54	40.78	4.28	9.0	30.65	7.07	23.59	40.06	4.34	22.8	30.60	6.97	23.63	39.33	4.39	40.7
			45	29.29	9.10	20.18	50.50	3.22	8.3	29.21	8.98	20.23	49.81	3.25	21.4	29.13	8.86	20.27	49.11	3.29	39.3
10	0.95	9.7	15	32.39	4.56	27.83	21.61	7.10	10.3	32.39	4.50	27.89	20.86	7.19	25.5	32.39	4.44	27.94	20.11	7.29	45.5
			25	32.65	5.63	27.03	31.11	5.80	9.7	32.63	5.55	27.07	30.36	5.88	23.4	32.60	5.48	27.12	29.61	5.95	42.7
			30	32.55	6.30	26.25	36.11	5.17	9.7	32.52	6.22	26.30	35.33	5.23	22.8	32.49	6.13	26.36	34.56	5.30	42.1
			35	32.28	7.10	25.18	41.06	4.55	9.0	32.23	7.00	25.23	40.31	4.60	22.8	32.18	6.90	25.27	39.56	4.66	40.7
			45	31.34	9.07	22.27	50.83	3.46	8.3	31.23	8.95	22.29	50.11	3.49	21.4	31.13	8.82	22.30	49.39	3.53	39.3
			50	Operation Not Recommended						30.76	10.15	20.61	55.78	3.03	20.7	30.55	9.87	20.68	54.33	3.09	38.6
	1.42	26.2	15	35.96	4.61	31.36	22.33	7.80	10.3	35.99	4.59	31.40	22.00	7.84	25.5	36.02	4.46	31.56	20.61	8.07	45.5
			25	35.96	5.72	30.24	31.78	6.28	9.7	35.99	5.67	30.32	31.44	6.34	23.4	36.02	5.56	30.46	30.06	6.48	42.7
			30	35.75	6.41	29.34	36.72	5.58	9.7	35.75	6.36	29.39	36.39	5.62	22.8	35.75	6.23	29.52	35.00	5.74	42.1
			35	35.33	7.22	28.12	41.61	4.90	9.0	35.31	7.17	28.14	41.33	4.93	22.8	35.28	7.02	28.26	39.94	5.03	40.7
			45	33.65	9.13	24.52	51.28	3.68	8.3	33.57	9.10	24.47	51.11	3.69	21.4	33.49	8.87	24.62	49.72	3.77	39.3
			50	Operation Not Recommended						32.60	10.15	22.45	55.94	3.21	20.7	32.44	9.87	22.57	54.56	3.29	38.6
	1.89	46.9	15	35.96	4.61	31.36	22.33	7.80	10.3	35.99	4.61	31.38	22.33	7.81	25.5	36.02	4.48	31.54	20.61	8.04	45.5
			25	36.02	5.72	30.29	31.78	6.29	9.7	36.02	5.72	30.29	31.78	6.29	23.4	36.02	5.56	30.46	30.06	6.48	42.7
			30	35.81	6.41	29.39	36.72	5.58	9.7	35.78	6.32	29.46	36.72	5.66	22.8	35.75	6.23	29.52	35.00	5.74	42.1
			35	35.33	7.22	28.12	41.61	4.90	9.0	35.31	7.22	28.09	41.61	4.89	22.8	35.28	7.02	28.26	40.00	5.03	40.7
			45	33.65	9.13	24.52	51.28	3.68	8.3	33.60	9.13	24.46	51.28	3.68	21.4	33.55	8.87	24.67	49.72	3.78	39.3
			50	Operation Not Recommended						32.60	10.17	22.43	56.11	3.21	20.7	32.44	9.87	22.57	54.56	3.29	38.6
15	0.95	9.0	15	33.86	4.61	29.25	21.89	7.35	10.3	33.86	4.55	29.31	21.11	7.44	25.5	33.86	4.49	29.37	20.33	7.54	45.5
			25	34.39	5.64	28.75	31.44	6.10	9.7	34.39	5.56	28.83	30.64	6.19	23.4	34.39	5.48	28.91	29.83	6.28	42.7
			30	34.44	6.30	28.14	36.44	5.47	9.7	34.41	6.21	28.21	35.64	5.54	22.8	34.39	6.12	28.27	34.83	5.62	42.1
			35	34.39	7.08	27.30	41.44	4.85	9.0	34.33	6.99	27.35	40.64	4.91	22.8	34.28	6.89	27.39	39.83	4.98	40.7
			45	34.02	9.05	24.97	51.39	3.76	8.3	33.97	8.93	25.04	50.58	3.80	21.4	33.91	8.81	25.11	49.78	3.85	39.3
			50	Operation Not Recommended						33.84	10.14	23.70	56.39	1.66	20.7	33.65	9.87	23.78	54.72	3.41	38.6
	1.42	24.1	15	37.80	4.66	33.15	22.67	8.12	10.3	37.83	4.59	33.24	21.78	8.24	25.5	37.86	4.53	33.33	20.89	8.36	45.5
			25	38.17	5.76	32.42	32.17	6.63	9.7	38.15	5.67	32.47	31.28	6.72	23.4	38.12	5.59	32.53	30.39	6.82	42.7
			30	38.12	6.45	31.67	37.17	5.91	9.7	38.09	6.36	31.74	36.28	5.99	22.8	38.07	6.26	31.80	35.39	6.08	42.1
			35	37.86	7.23	30.62	42.11	5.23	9.0	37.86	7.13	30.72	41.22	5.31	22.8	37.86	7.04	30.82	40.33	5.38	40.7
			45	36.81	9.15	27.65	51.89	4.02	8.3	36.75	9.03	27.72	51.03	4.07	21.4	36.70	8.91	27.80	50.17	4.12	39.3
			50	Operation Not Recommended						36.40	9.97	26.43	55.83	1.80	20.7	35.96	9.92	26.04	55.06	3.62	38.6
	1.89	44.1	15	37.86	4.66	33.20	22.67	8.13	10.3	37.88	4.59	33.29	21.78	8.25	25.5	37.91	4.53	33.38	20.89	8.38	45.5
			25	38.17	5.76	32.42	32.17	6.63	9.7	38.17	5.67	32.50	31.28	6.73	23.4	38.17	5.59	32.58	30.39	6.83	42.7
			30	38.12	6.45	31.67	37.17	5.91	9.7	38.12	6.36	31.76	36.28	6.00	22.8	38.12	6.26	31.86	35.39	6.08	42.1
			35	37.91	7.23	30.68	42.11	5.24	9.0	37.88	7.13	30.75	41.22	5.31	22.8	37.86	7.04	30.82	40.33	5.38	40.7
			45	36.86	9.15	27.71	51.94	4.03	8.3	36.78	9.03	27.75	51.06	4.07	21.4	36.70	8.91	27.80	50.17	4.12	39.3
			50	Operation Not Recommended												36.02	9.92	26.09	55.06	3.63	38.6

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

HEATING CAPACITIES (cont)

50PSW120 (cont)

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 0.95 l/s						Flow 1.42 l/s						Flow 1.89 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
20	0.95	8.3	15	35.33	4.64	30.69	22.22	7.61	10.3	35.36	4.58	30.78	21.39	7.71	25.5	35.39	4.53	30.86	20.56	7.82	45.5
			25	36.07	5.64	30.43	31.78	6.39	9.7	36.07	5.57	30.50	30.94	6.48	23.4	36.07	5.49	30.58	30.11	6.57	42.7
			30	36.33	6.28	30.05	36.83	5.78	9.7	36.31	6.20	30.11	35.97	5.86	22.8	36.28	6.12	30.16	35.11	5.93	42.1
			35	36.49	7.07	29.42	41.83	5.16	9.0	36.46	6.97	29.49	40.97	5.23	22.8	36.44	6.87	29.57	40.11	5.30	40.7
			45	36.75	9.04	27.72	51.89	4.07	8.3	36.70	8.91	27.79	51.03	4.12	21.4	36.65	8.79	27.86	50.17	4.17	39.3
			50	Operation Not Recommended												36.75	9.86	26.90	55.17	3.73	38.6
	1.42	22.8	15	37.54	4.66	32.88	22.61	8.06	10.3	37.57	4.60	32.97	21.72	8.17	25.5	37.59	4.54	33.05	20.83	8.28	45.5
			25	38.17	5.71	32.47	32.17	6.69	9.7	38.20	5.63	32.57	31.28	6.78	23.4	38.23	5.56	32.67	30.39	6.88	42.7
			30	38.38	6.38	32.00	37.22	6.02	9.7	38.38	6.29	32.09	36.31	6.10	22.8	38.38	6.20	32.18	35.39	6.19	42.1
			35	38.49	7.17	31.32	42.22	5.37	9.0	38.46	7.07	31.39	41.33	5.44	22.8	38.44	6.97	31.47	40.44	5.51	40.7
			45	38.38	9.12	29.26	52.22	4.21	8.3	38.33	9.00	29.33	51.31	4.26	21.4	38.28	8.87	29.41	50.39	4.31	39.3
			50	Operation Not Recommended												38.17	9.91	28.27	55.39	3.85	38.6
	1.89	42.1	15	39.75	4.69	35.06	23.06	8.47	10.3	39.78	4.62	35.15	22.11	8.60	25.5	39.80	4.56	35.24	21.17	8.73	45.5
			25	40.33	5.77	34.56	32.56	6.99	9.7	40.33	5.69	34.64	31.64	7.09	23.4	40.33	5.61	34.72	30.72	7.19	42.7
			30	40.43	6.46	33.97	37.61	6.26	9.7	40.43	6.37	34.06	36.67	6.35	22.8	40.43	6.28	34.15	35.72	6.44	42.1
			35	40.49	7.27	33.22	42.61	5.57	9.0	40.46	7.17	33.29	41.67	5.65	22.8	40.43	7.07	33.37	40.72	5.72	40.7
			45	40.07	9.18	30.88	52.50	4.36	8.3	40.01	9.06	30.95	51.56	4.42	21.4	39.96	8.94	31.02	50.61	4.47	39.3
			50	Operation Not Recommended												39.59	9.95	29.64	55.61	3.98	38.6
25	0.95	7.6	15	36.81	4.69	32.12	22.44	7.85	10.3	36.83	4.62	32.21	21.61	7.96	25.5	36.86	4.56	32.30	20.78	8.08	45.5
			25	37.80	5.64	32.16	32.11	6.70	9.7	37.80	5.57	32.24	31.22	6.79	23.4	37.80	5.49	32.31	30.33	6.88	42.7
			30	38.23	6.28	31.94	37.17	6.09	9.7	38.23	6.20	32.03	36.28	6.17	22.8	38.23	6.12	32.11	35.39	6.25	42.1
			35	38.59	7.05	31.54	42.28	5.47	9.0	38.57	6.95	31.61	41.36	5.55	22.8	38.54	6.86	31.69	40.44	5.62	40.7
			45	39.49	9.02	30.47	52.44	4.38	8.3	39.41	8.90	30.51	51.50	4.43	21.4	39.33	8.77	30.56	50.56	4.48	39.3
			50	Operation Not Recommended												39.86	9.84	30.02	55.61	4.05	38.6
	1.42	21.4	15	39.22	4.71	34.52	22.94	8.33	10.3	39.25	4.64	34.61	22.00	8.46	25.5	39.28	4.58	34.70	21.06	8.58	45.5
			25	40.12	5.72	34.39	32.50	7.01	9.7	40.14	5.64	34.50	31.58	7.12	23.4	40.17	5.56	34.61	30.67	7.23	42.7
			30	40.54	6.38	34.16	37.61	6.35	9.7	40.51	6.29	34.22	36.67	6.44	22.8	40.49	6.20	34.29	35.72	6.53	42.1
			35	40.75	7.17	33.58	42.72	5.69	9.0	40.78	7.07	33.71	41.75	5.77	22.8	40.80	6.97	33.83	40.78	5.85	40.7
			45	41.38	9.12	32.26	52.78	4.54	8.3	41.33	9.00	32.33	51.81	4.59	21.4	41.27	8.87	32.40	50.83	4.65	39.3
			50	Operation Not Recommended												43.17	9.92	33.25	55.83	4.35	38.6
	1.89	40.7	15	41.64	4.72	36.92	23.39	8.82	10.3	41.67	4.66	37.01	22.39	8.95	25.5	41.70	4.59	37.10	21.39	9.08	45.5
			25	42.43	5.81	36.63	32.94	7.31	9.7	42.46	5.72	36.73	31.97	7.42	23.4	42.48	5.64	36.84	31.00	7.53	42.7
			30	42.80	6.48	36.32	38.06	6.61	9.7	42.77	6.39	36.39	37.06	6.70	22.8	42.75	6.30	36.45	36.06	6.79	42.1
			35	43.01	7.28	35.73	43.11	5.91	9.0	43.01	7.18	35.83	42.08	5.99	22.8	43.01	7.08	35.92	41.06	6.07	40.7
			45	43.27	9.22	34.06	53.11	4.69	8.3	43.22	9.09	34.13	52.08	4.75	21.4	43.17	8.97	34.20	51.06	4.81	39.3
			50	Operation Not Recommended												43.17	10.00	33.16	56.06	4.32	38.6

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

HEATING CAPACITIES (cont)

50PSW180

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 1.14 l/s						Flow 1.70 l/s						Flow 2.21 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
-5	2.21	35.50	15	29.1	5.45	23.6	21.3	5.33	2.17	30.5	5.90	24.6	19.4	5.17	11.01	31.1	5.45	25.7	18.4	5.71	21.68
			20	27.8	6.11	21.7	26.0	4.55	1.38	29.2	6.60	22.6	24.2	4.42	10.38	29.6	6.04	23.5	23.2	4.90	20.72
			25	27.6	6.61	21.0	31.0	4.18	1.06	28.5	6.61	21.9	29.1	4.31	9.91	29.4	6.62	22.8	28.2	4.45	19.98
0	1.14	5.55	15	31.6	5.50	26.1	21.8	5.76	2.17	32.7	5.50	27.2	19.6	5.95	11.01	34.2	5.89	28.3	18.7	5.80	21.68
			20	30.1	6.15	24.0	26.6	4.90	1.38	31.1	6.15	24.9	24.5	5.05	10.38	32.4	6.52	25.9	23.5	4.97	20.72
			25	29.7	6.66	23.0	31.4	4.46	1.06	30.6	6.65	23.9	29.4	4.60	9.91	31.5	6.66	24.9	28.4	4.74	19.98
			30	28.6	7.07	21.6	36.2	4.05	0.88	29.5	7.06	22.4	34.2	4.17	9.47	30.3	7.06	23.3	33.3	4.30	19.30
			35	27.3	7.56	19.7	41.0	3.61	0.71	28.0	7.55	20.5	39.1	3.71	9.09	28.8	7.55	21.3	38.2	3.82	18.62
	1.70	18.35	15	32.9	5.52	27.4	22.1	5.96	2.17	34.5	5.91	28.6	19.9	5.83	11.01	35.6	5.89	29.8	18.8	6.06	21.68
			20	31.3	6.18	25.1	26.8	5.07	1.38	32.8	6.62	26.2	24.7	4.96	10.38	33.8	6.53	27.3	23.7	5.18	20.72
			25	30.9	6.69	24.2	31.7	4.62	1.06	31.9	6.68	25.2	29.6	4.77	9.91	32.9	6.69	26.2	28.6	4.93	19.98
			30	29.7	7.09	22.6	36.5	4.19	0.88	30.7	7.09	23.6	34.4	4.32	9.47	31.6	7.09	24.6	33.4	4.47	19.30
			35	28.3	7.58	20.7	41.2	3.73	0.71	29.1	7.58	21.6	39.2	3.84	9.09	30.1	7.58	22.5	38.3	3.96	18.62
	2.21	32.78	15	33.6	5.54	28.0	22.2	6.06	2.17	35.1	5.91	29.2	20.0	5.95	11.01	36.4	5.89	30.5	18.9	6.18	21.68
			20	31.9	6.20	25.7	26.9	5.15	1.38	33.4	6.62	26.8	24.8	5.05	10.38	34.5	6.53	28.0	23.7	5.29	20.72
			25	31.5	6.70	24.8	31.8	4.70	1.06	32.5	6.70	25.8	29.6	4.85	9.91	33.6	6.71	26.9	28.6	5.02	19.98
			30	30.3	7.11	23.2	36.6	4.26	0.88	31.3	7.11	24.2	34.5	4.40	9.47	32.3	7.11	25.2	33.5	4.55	19.30
			35	29.6	7.60	22.0	41.5	3.90	0.71	29.7	7.60	22.1	39.3	3.91	9.09	30.7	7.60	23.1	38.3	4.04	18.62
5	1.14	4.64	15	34.5	5.55	28.9	22.4	6.21	2.17	35.6	5.55	30.1	20.1	6.43	11.01	37.2	5.89	31.3	19.0	6.32	21.68
			20	32.8	6.22	26.5	27.1	5.27	1.38	33.8	6.21	27.6	24.9	5.44	10.38	35.2	6.53	28.7	23.8	5.40	20.72
			25	32.7	6.73	26.0	32.1	4.87	1.06	33.8	6.73	27.0	29.8	5.02	9.91	34.8	6.73	28.1	28.8	5.18	19.98
			30	31.5	7.14	24.3	36.8	4.41	0.88	32.4	7.14	25.3	34.7	4.55	9.47	33.4	7.13	26.3	33.6	4.69	19.30
			35	30.4	7.64	22.8	41.6	3.98	0.71	31.3	7.64	23.7	39.5	4.10	9.09	32.3	7.63	24.7	38.5	4.23	18.62
	1.70	16.60	15	35.8	5.58	30.2	22.7	6.42	2.17	37.4	5.92	31.5	20.3	6.32	11.01	38.7	5.89	32.8	19.2	6.57	21.68
			20	34.0	6.25	27.7	27.4	5.44	1.38	35.5	6.63	28.9	25.1	5.36	10.38	36.6	6.54	30.1	24.0	5.61	20.72
			25	34.0	6.76	27.2	32.3	5.03	1.06	35.1	6.76	28.3	30.0	5.20	9.91	36.3	6.77	29.6	28.9	5.37	19.98
			30	32.6	7.18	25.5	37.1	4.55	0.88	33.7	7.17	26.5	34.8	4.70	9.47	34.8	7.17	27.7	33.8	4.86	19.30
			35	31.6	7.68	23.9	41.9	4.12	0.71	32.6	7.67	24.9	39.7	4.25	9.09	33.6	7.67	26.0	38.7	4.39	18.62
	2.21	30.06	15	36.4	5.60	30.9	22.8	6.51	2.17	38.1	5.92	32.2	20.4	6.44	11.01	39.5	5.89	33.6	19.2	6.70	21.68
			20	34.6	6.27	28.3	27.5	5.52	1.38	36.1	6.63	29.5	25.2	5.45	10.38	37.3	6.54	30.8	24.1	5.71	20.72
			25	34.6	6.78	27.8	32.5	5.10	1.06	35.8	6.78	29.0	30.1	5.28	9.91	37.1	6.78	30.3	29.0	5.46	19.98
			30	33.2	7.19	26.0	37.2	4.62	0.88	34.3	7.19	27.2	34.9	4.78	9.47	35.5	7.19	28.3	33.9	4.94	19.30
			35	33.1	7.69	25.4	42.2	4.30	0.71	33.2	7.69	25.5	39.8	4.32	9.09	34.3	7.69	26.6	38.7	4.46	18.62
10	1.14	2.96	15	37.1	5.62	31.5	23.0	6.61	2.17	38.4	5.61	32.8	20.4	6.85	11.01	40.0	5.90	34.1	19.3	6.79	21.68
			20	35.2	6.29	28.9	27.7	5.60	1.38	36.4	6.28	30.1	25.2	5.79	10.38	37.8	6.54	31.3	24.1	5.79	20.72
			25	35.6	6.80	28.8	32.7	5.23	1.06	36.7	6.80	29.9	30.2	5.41	9.91	38.0	6.81	31.2	29.1	5.58	19.98
			30	34.2	7.22	26.9	37.4	4.73	0.88	35.2	7.22	28.0	35.1	4.88	9.47	36.4	7.21	29.2	33.9	5.04	19.30
			35	33.5	7.73	25.8	42.3	4.33	0.71	34.5	7.72	26.8	39.9	4.47	9.09	35.6	7.72	27.9	38.9	4.61	18.62
			40	32.2	8.48	23.7	47.0	3.80	0.58	33.2	8.47	24.7	44.8	3.92	8.67	34.2	8.47	25.7	43.7	4.03	18.04
			45	31.7	9.22	22.5	52.0	3.44	0.54	32.6	9.22	23.4	49.7	3.54	8.40	33.6	9.22	24.3	48.7	3.64	17.59
			50	31.2	9.97	21.3	56.9	3.13	0.47	32.1	9.97	22.1	54.7	3.22	8.06	33.0	9.97	23.0	53.6	3.31	17.04
	1.70	11.64	15	38.5	5.65	32.8	23.2	6.81	2.17	40.1	5.92	34.2	20.7	6.78	11.01	41.6	5.90	35.7	19.5	7.04	21.68
			20	36.4	6.33	30.1	27.9	5.76	1.38	38.0	6.63	31.4	25.5	5.73	10.38	39.2	6.54	32.7	24.3	6.00	20.72
			25	36.9	6.84	30.0	32.9	5.39	1.06	38.1	6.84	31.3	30.4	5.58	9.91	39.5	6.85	32.6	29.2	5.77	19.98
			30	35.4	7.26	28.1	37.7	4.88	0.88	36.5	7.26	29.3	35.2	5.04	9.47	37.8	7.25	30.5	34.1	5.21	19.30
			35	34.7	7.77	27.0	42.5	4.47	0.71	35.8	7.76	28.1	40.1	4.62	9.09	37.0	7.76	29.3	39.0	4.78	18.62
			40	33.4	8.52	24.9	47.3	3.92	0.58	34.4	8.52	25.9	45.0	4.04	8.67	35.5	8.51	27.0	43.9	4.17	18.04
			45	32.8	9.25	23.5	52.2	3.55	0.54	33.8	9.24	24.5	49.9	3.65	8.40	34.8	9.24	25.6	48.8	3.77	17.59
			50	32.2	10.00	22.2	57.1	3.22	0.47	33.2	10.00	23.2	54.8	3.32	8.06	34.1	9.99	24.2	53.8	3.42	17.04
	2.21	22.64	15	39.1	5.66	33.4	23.4	6.91	2.17	40.8	5.92	34.9	20.8	6.89	11.01	42.3	5.90	36.4	19.5	7.17	21.68
			20	37.0	6.34	30.7	28.1	5.84	1.38	38.6	6.63	32.0	25.5	5.82	10.38	39.9	6.54	33.4	24.3	6.11	20.72
			25	37.5	6.86	30.7	33.1	5.47	1.06	38.8	6.86	32.0	30.5	5.66	9.91	40.2	6.86	33.4	29.3	5.86	19.98
			30	36.0	7.28	28.7	37.8	4.94	0.88	37.2	7.28	29.9	35.3	5.11	9.47	38.5	7.28	31.2	34.2	5.29	19.30
			35	36.4	7.79	28.6	42.9	4.67	0.71	36.5	7.78	28.7	40.2	4.69	9.09	37.8	7.78	30.0	39.1	4.86	18.62
			40	34.9	8.54	26.4	47.6	4.09	0.58	35.0	8.54	26.5	45.0	4.10	8.67	36.2	8.54	27.6	43.9	4.24	18.04
			45	33.3	9.26	24.0	52.3	3.60	0.54	34.3	9.26	25.1	50.0	3.71	8.40	35.4	9.26	26.2	48.9	3.83	17.59
			50	32.7	10.01	22.7	57.2	3.27	0.47	33.7	10.01	23.7	54.9	3.37	8.06	34.7	10.01	24.7	53.8	3.47	17.04

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

HEATING CAPACITIES (cont)

50PSW180 (cont)

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 1.14 l/s						Flow 1.70 l/s						Flow 2.21 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
15	1.14	2.17	15	39.9	5.69	34.2	23.5	7.02	2.17	41.3	5.68	35.6	20.8	7.27	11.01	43.0	5.90	37.1	19.6	7.29	21.68
			20	37.7	6.37	31.4	28.2	5.93	1.38	39.0	6.36	32.6	25.6	6.13	10.38	40.6	6.54	34.0	24.4	6.20	20.72
			25	38.6	6.90	31.7	33.3	5.60	1.06	39.9	6.89	33.0	30.7	5.79	9.91	41.3	6.90	34.4	29.4	5.98	19.98
			30	37.0	7.32	29.7	38.0	5.06	0.88	38.2	7.32	30.9	35.5	5.22	9.47	39.5	7.31	32.2	34.3	5.40	19.30
			35	36.8	7.83	29.0	42.0	4.70	0.71	38.0	7.83	30.2	40.4	4.85	9.09	39.2	7.82	31.4	39.2	5.01	18.62
			40	35.3	8.59	26.7	47.7	4.11	0.58	36.4	8.59	27.8	45.2	4.24	8.67	37.5	8.58	28.9	44.1	4.37	18.04
			45	35.0	9.31	25.7	52.6	3.76	0.54	36.0	9.30	26.7	50.2	3.87	8.40	37.1	9.29	27.8	49.0	3.99	17.59
			50	34.3	10.06	24.3	57.5	3.41	0.47	35.3	10.06	25.2	55.1	3.51	8.06	36.3	10.05	26.3	54.0	3.61	17.04
	1.70	11.01	15	41.2	5.73	35.4	23.8	7.19	2.17	42.9	5.93	37.0	21.1	7.23	11.01	44.5	5.91	38.6	19.8	7.53	21.68
			20	38.9	6.41	32.5	28.5	6.07	1.38	40.5	6.65	33.9	25.8	6.10	10.38	41.9	6.55	35.4	24.6	6.40	20.72
			25	39.9	6.94	33.0	33.6	5.75	1.06	41.3	6.94	34.4	30.8	5.96	9.91	42.8	6.94	35.9	29.6	6.17	19.98
			30	38.2	7.36	30.9	38.3	5.19	0.88	39.5	7.36	32.2	35.7	5.37	9.47	40.9	7.36	33.6	34.4	5.56	19.30
			35	38.1	7.88	30.3	43.2	4.84	0.71	39.4	7.87	31.5	40.6	5.01	9.09	40.7	7.87	32.9	39.4	5.18	18.62
			40	36.5	8.64	27.9	48.0	4.23	0.58	37.7	8.63	29.0	45.4	4.37	8.67	38.9	8.63	30.3	44.2	4.51	18.04
			45	36.1	9.34	26.8	52.9	3.87	0.54	37.2	9.33	27.9	50.3	3.99	8.40	38.4	9.33	29.1	49.2	4.12	17.59
			50	35.4	10.09	25.3	57.8	3.51	0.47	36.4	10.09	26.4	55.3	3.61	8.06	37.6	10.09	27.5	54.1	3.73	17.04
	2.21	21.68	15	41.8	5.75	36.0	23.9	7.27	2.17	43.5	5.93	37.6	21.2	7.34	11.01	45.2	5.91	39.3	19.8	7.65	21.68
			20	39.5	6.44	33.0	28.6	6.14	1.38	41.1	6.65	34.5	25.9	6.19	10.38	42.6	6.55	36.0	24.6	6.50	20.72
			25	40.5	6.96	33.6	33.7	5.83	1.06	42.0	6.95	35.0	30.9	6.04	9.91	43.6	6.97	36.6	29.7	6.25	19.98
			30	38.8	7.39	31.4	38.4	5.26	0.88	40.2	7.39	32.8	35.7	5.44	9.47	41.6	7.38	34.2	34.5	5.64	19.30
			35	40.0	7.90	32.1	43.6	5.06	0.71	40.1	7.89	32.2	40.7	5.08	9.09	41.5	7.89	33.6	39.5	5.26	18.62
			40	38.2	8.66	29.5	48.3	4.41	0.58	38.3	8.66	29.7	45.5	4.43	8.67	39.6	8.66	31.0	44.3	4.58	18.04
			45	36.7	9.36	27.3	53.0	3.92	0.54	37.8	9.35	28.5	50.4	4.05	8.40	39.1	9.34	29.7	49.2	4.18	17.59
			50	35.9	10.11	25.8	57.9	3.55	0.47	37.0	10.11	26.9	55.4	3.66	8.06	38.2	10.10	28.1	54.2	3.78	17.04
20	1.14	1.38	15	41.7	5.75	36.0	23.9	7.27	2.17	43.2	5.74	37.5	21.1	7.54	11.01	45.0	5.91	39.1	19.8	7.61	21.68
			20	39.4	6.44	33.0	28.6	6.13	1.38	40.8	6.43	34.4	25.9	6.35	10.38	42.4	6.55	35.8	24.6	6.47	20.72
			25	40.7	6.97	33.7	33.7	5.84	1.06	42.1	6.96	35.1	31.0	6.05	9.91	43.5	6.97	36.6	29.7	6.25	19.98
			30	39.0	7.39	31.6	38.4	5.27	0.88	40.2	7.39	32.9	35.8	5.45	9.47	41.6	7.38	34.2	34.5	5.64	19.30
			35	39.2	7.91	31.3	43.4	4.95	0.71	40.4	7.91	32.5	40.7	5.11	9.09	41.8	7.90	33.9	39.5	5.29	18.62
			40	37.5	8.68	28.8	48.2	4.32	0.58	38.6	8.68	30.0	45.6	4.45	8.67	11.8	8.67	3.1	44.3	1.36	18.04
			45	37.3	9.37	27.9	53.1	3.98	0.54	38.4	9.37	29.0	50.5	4.10	8.40	39.6	9.36	30.2	49.3	4.23	17.59
			50	36.5	10.13	26.4	58.0	3.60	0.47	37.6	10.13	27.4	55.4	3.71	8.06	38.7	10.12	28.6	54.2	3.82	17.04
	1.70	10.38	15	43.0	5.79	37.2	24.2	7.42	2.17	44.7	5.94	38.8	21.3	7.53	11.01	46.4	5.91	40.5	20.0	7.85	21.68
			20	40.6	6.48	34.1	28.8	6.26	1.38	42.2	6.65	35.6	26.1	6.35	10.38	43.7	6.55	37.1	24.7	6.67	20.72
			25	42.0	7.01	35.0	34.0	5.99	1.06	43.5	7.01	36.5	31.1	6.20	9.91	45.1	7.02	38.0	29.8	6.42	19.98
			30	40.2	7.45	32.7	38.7	5.39	0.88	41.6	7.44	34.1	35.9	5.59	9.47	43.0	7.43	35.6	34.7	5.79	19.30
			35	40.5	7.97	32.6	43.7	5.09	0.71	41.9	7.96	33.9	40.9	5.26	9.09	43.3	7.95	35.4	39.7	5.45	18.62
			40	38.7	8.74	30.0	48.5	4.43	0.58	40.0	8.73	31.3	45.8	4.58	8.67	41.3	8.73	32.6	44.5	4.74	18.04
			45	38.4	9.41	29.0	53.3	4.08	0.54	39.6	9.40	30.2	50.7	4.22	8.40	41.0	9.40	31.6	49.4	4.36	17.59
			50	37.6	10.17	27.4	58.2	3.70	0.47	38.7	10.17	28.6	55.6	3.81	8.06	40.0	10.17	29.8	54.4	3.93	17.04
	2.21	20.72	15	43.5	5.81	37.7	24.3	7.49	2.17	45.3	5.94	39.4	21.4	7.63	11.01	47.0	5.91	41.1	20.0	7.96	21.68
			20	41.1	6.51	34.6	29.0	6.32	1.38	42.8	6.65	36.1	26.1	6.43	10.38	44.3	6.55	37.7	24.8	6.76	20.72
			25	42.6	7.04	35.5	34.1	6.05	1.06	44.1	7.03	37.1	31.2	6.28	9.91	45.8	7.05	38.7	29.9	6.50	19.98
			30	40.7	7.47	33.3	38.8	5.46	0.88	42.2	7.47	34.7	36.0	5.65	9.47	43.7	7.46	36.3	34.7	5.86	19.30
			35	42.4	7.99	34.5	44.1	5.31	0.71	42.6	7.99	34.6	41.0	5.34	9.09	44.1	7.98	36.2	39.7	5.53	18.62
			40	40.5	8.76	31.7	48.8	4.62	0.58	40.7	8.76	31.9	45.9	4.64	8.67	42.1	8.76	33.3	44.6	4.80	18.04
			45	39.0	9.43	29.6	53.4	4.14	0.54	40.3	9.43	30.8	50.7	4.27	8.40	41.6	9.42	32.2	49.5	4.42	17.59
			50	38.1	10.19	27.9	58.3	3.74	0.47	39.3	10.19	29.1	55.7	3.86	8.06	40.6	10.19	30.4	54.4	3.99	17.04

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

HEATING CAPACITIES
50PSW360

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 2.21 l/s						Flow 3.34 l/s						Flow 4.42 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
-5	4.42	50.93	15	58.11	10.90	47.21	21.27	5.33	7.66	60.99	11.79	49.20	19.35	5.17	23.87	62.22	10.89	51.33	18.35	5.71	43.00
			20	55.51	12.21	43.30	26.03	4.55	7.10	58.31	13.20	45.11	24.18	4.42	22.88	59.14	12.07	47.07	23.21	4.90	41.10
			25	55.21	13.22	41.99	31.01	4.18	6.65	56.97	13.22	43.75	29.09	4.31	22.04	58.86	13.23	45.63	28.19	4.45	39.63
0	2.21	11.12	15	63.28	10.99	52.29	21.81	5.76	7.66	65.34	10.99	54.35	19.64	5.95	23.87	68.30	11.77	56.53	18.68	5.80	43.00
			20	60.25	12.30	47.95	26.55	4.90	7.10	62.14	12.30	49.84	24.46	5.05	22.88	64.87	13.04	51.83	23.52	4.97	41.10
			25	59.36	13.31	46.05	31.44	4.46	6.65	61.16	13.30	47.86	29.37	4.60	22.04	63.09	13.32	49.77	28.41	4.74	39.63
			30	57.23	14.13	43.10	36.23	4.05	6.27	58.91	14.12	44.79	34.23	4.17	21.23	60.69	14.11	46.58	33.30	4.30	38.42
			35	54.52	15.11	39.41	40.98	3.61	5.92	56.04	15.10	40.94	39.05	3.71	20.42	57.67	15.09	42.58	38.15	3.82	37.32
	3.34	27.57	15	65.85	11.04	54.81	22.08	5.96	7.66	68.91	11.81	57.10	19.90	5.83	23.87	71.28	11.77	59.51	18.83	6.06	43.00
			20	62.63	12.36	50.27	26.81	5.07	7.10	65.59	13.23	52.36	24.70	4.96	22.88	67.61	13.05	54.56	23.67	5.18	41.10
			25	61.74	13.37	48.37	31.68	4.62	6.65	63.71	13.36	50.35	29.55	4.77	22.04	65.86	13.37	52.49	28.56	4.93	39.63
			30	59.45	14.18	45.27	36.47	4.19	6.27	61.31	14.18	47.13	34.40	4.32	21.23	63.29	14.17	49.12	33.44	4.47	38.42
			35	56.58	15.16	41.42	41.19	3.73	5.92	58.29	15.16	43.13	39.20	3.84	20.42	60.10	15.16	44.94	38.28	3.96	37.32
	4.42	49.07	15	67.12	11.07	56.05	22.22	6.06	7.66	70.27	11.82	58.45	19.99	5.95	23.87	72.76	11.77	60.99	18.91	6.18	43.00
			20	63.79	12.39	51.40	26.94	5.15	7.10	66.82	13.23	53.59	24.79	5.05	22.88	68.97	13.05	55.92	23.74	5.29	41.10
			25	62.90	13.39	49.51	31.80	4.70	6.65	65.00	13.39	51.61	29.64	4.85	22.04	67.26	13.41	53.85	28.63	5.02	39.63
			30	60.55	14.21	46.34	36.59	4.26	6.27	62.52	14.21	48.31	34.49	4.40	21.23	64.60	14.21	50.39	33.51	4.55	38.42
			35	59.20	15.19	44.01	41.46	3.90	5.92	59.42	15.19	44.23	39.28	3.91	20.42	61.34	15.19	46.15	38.34	4.04	37.32
5	2.21	10.57	15	68.98	11.10	57.88	22.41	6.21	7.66	71.28	11.09	60.19	20.05	6.43	23.87	74.39	11.77	62.62	18.99	6.32	43.00
			20	65.50	12.43	53.07	27.12	5.27	7.10	67.61	12.42	55.19	24.85	5.44	22.88	70.48	13.06	57.42	23.82	5.40	41.10
			25	65.45	13.45	52.00	32.07	4.87	6.65	67.51	13.45	54.06	29.81	5.02	22.04	69.68	13.46	56.22	28.75	5.18	39.63
			30	62.95	14.28	48.67	36.84	4.41	6.27	64.87	14.27	50.60	34.65	4.55	21.23	66.88	14.26	52.62	33.63	4.69	38.42
			35	60.89	15.28	45.61	41.63	3.98	5.92	62.66	15.27	47.39	39.50	4.10	20.42	64.57	15.26	49.31	38.51	4.23	37.32
	3.34	26.36	15	71.61	11.16	60.45	22.69	6.42	7.66	74.82	11.83	62.99	20.30	6.32	23.87	77.45	11.78	65.67	19.15	6.57	43.00
			20	67.92	12.49	55.43	27.39	5.44	7.10	71.01	13.25	57.76	25.09	5.36	22.88	73.29	13.07	60.22	23.97	5.61	41.10
			25	67.94	13.52	54.42	32.33	5.03	6.65	70.20	13.51	56.69	29.99	5.20	22.04	72.64	13.53	59.11	28.91	5.37	39.63
			30	65.29	14.35	50.94	37.10	4.55	6.27	67.40	14.34	53.06	34.83	4.70	21.23	69.67	14.34	55.33	33.78	4.86	38.42
			35	63.18	15.35	47.83	41.87	4.12	5.92	65.15	15.34	49.81	39.67	4.25	20.42	67.26	15.33	51.93	38.65	4.39	37.32
	4.42	46.94	15	72.89	11.19	61.70	22.82	6.51	7.66	76.19	11.83	64.36	20.40	6.44	23.87	78.96	11.78	67.18	19.23	6.70	43.00
			20	69.11	12.53	56.58	27.52	5.52	7.10	72.25	13.25	59.00	25.19	5.45	22.88	74.67	13.07	61.60	24.05	5.71	41.10
			25	69.17	13.55	55.62	32.45	5.10	6.65	71.57	13.55	58.02	30.09	5.28	22.04	74.10	13.56	60.54	28.98	5.46	39.63
			30	66.45	14.38	52.07	37.22	4.62	6.27	68.68	14.38	54.30	34.92	4.78	21.23	71.03	14.37	56.66	33.85	4.94	38.42
			35	66.14	15.37	50.77	42.17	4.30	5.92	66.40	15.37	51.03	39.76	4.32	20.42	68.62	15.37	53.25	38.71	4.46	37.32
10	2.21	8.19	15	74.27	11.23	63.04	22.97	6.61	7.66	76.82	11.21	65.61	20.44	6.85	23.87	80.07	11.79	68.28	19.29	6.79	43.00
			20	70.37	12.57	57.80	27.66	5.60	7.10	72.71	12.56	60.15	25.22	5.79	22.88	75.68	13.07	62.61	24.11	5.79	41.10
			25	71.16	13.60	57.56	32.66	5.23	6.65	73.47	13.59	59.88	30.22	5.41	22.04	75.92	13.61	62.31	29.08	5.58	39.63
			30	68.31	14.44	53.87	37.42	4.73	6.27	70.47	14.43	56.04	35.05	4.88	21.23	72.73	14.42	58.31	33.94	5.04	38.42
			35	67.01	15.46	51.55	42.26	4.33	5.92	69.03	15.44	53.59	39.93	4.47	20.42	71.18	15.43	55.75	38.85	4.61	37.32
			40	64.45	16.96	47.49	47.04	3.80	5.62	66.33	16.94	49.39	44.78	3.92	19.64	68.30	16.93	51.37	43.72	4.03	36.43
			45	63.44	18.44	45.00	51.96	3.44	5.39	65.24	18.44	46.80	49.72	3.54	18.92	67.11	18.43	48.68	48.67	3.64	35.85
			50	62.45	19.94	42.51	56.89	3.13	5.12	64.14	19.93	44.21	54.67	3.22	18.06	65.91	19.93	45.98	53.63	3.31	35.16
	3.34	24.76	15	76.92	11.29	65.63	23.24	6.81	7.66	80.23	11.84	68.39	20.68	6.78	23.87	83.13	11.80	71.33	19.45	7.04	43.00
			20	72.84	12.65	60.19	27.92	5.76	7.10	75.97	13.26	62.71	25.45	5.73	22.88	78.49	13.08	65.41	24.26	6.00	41.10
			25	73.75	13.68	60.07	32.93	5.39	6.65	76.27	13.67	62.60	30.41	5.58	22.04	78.97	13.69	65.28	29.24	5.77	39.63
			30	70.74	14.51	56.23	37.68	4.88	6.27	73.09	14.51	58.58	35.23	5.04	21.23	75.59	14.50	61.09	34.09	5.21	38.42
			35	69.48	15.53	53.95	42.51	4.47	5.92	71.69	15.52	56.17	40.12	4.62	20.42	74.09	15.51	58.58	39.00	4.78	37.32
			40	66.73	17.03	49.70	47.29	3.92	5.62	68.79	17.03	51.76	44.96	4.04	19.64	71.00	17.02	53.98	43.87	4.17	36.43
			45	65.55	18.49	47.06	52.18	3.55	5.39	67.50	18.48	49.02	49.88	3.65	18.92	69.61	18.48	51.13	48.80	3.77	35.85
			50	64.44	19.99	44.45	57.10	3.22	5.12	66.30	19.99	46.31	54.82	3.32	18.06	68.29	19.98	48.31	53.75	3.42	35.16
	4.42	44.84	15	78.18	11.32	66.86	23.38	6.91	7.66	81.59	11.84	69.75	20.77	6.89	23.87	84.63	11.80	72.83	19.53	7.17	43.00
			20	73.99	12.68	61.31	28.05	5.84	7.10	77.22	13.26	63.96	25.54	5.82	22.88	79.87	13.08	66.79	24.33	6.11	41.10
			25	75.01	13.71	61.30	33.06	5.47	6.65	77.65	13.71	63.94	30.50	5.66	22.04	80.45	13.72	66.73	29.31	5.86	39.63
			30	71.93	14.55	57.38	37.80	4.94	6.27	74.39	14.55	59.84	35.32	5.11	21.23	77.01	14.55	62.46	34.17	5.29	38.42
			35	72.78	15.57	57.21	42.85	4.67	5.92	73.05	15.56	57.49	40.21	4.69	20.42	75.54	15.55	59.99	39.07	4.86	37.32
			40	69.78	17.07	52.71	47.62	4.09	5.62	70.04	17.07	52.97	45.04	4.10	19.64	72.34	17.07	55.27	43.94	4.24	36.43
			45	66.61	18.52	48.09	52.29	3.60	5.39	68.66	18.51	50.15	49.95	3.71	18.92	70.86	18.51	52.35	48.86	3.83	35.85
			50	65.46	20.02	45.44	57.20	3.27	5.12	67.38	20.01	47.37	54.89	3.37	18.06	69.46	20.01	49.45	53.81	3.47	35.16

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Performance data (cont)

HEATING CAPACITIES
50PSW360 (cont)

SOURCE			LOAD																			
EWT C	Flow		EWT C	Flow 2.21 l/s						Flow 3.34 l/s						Flow 4.42 l/s					
	l/s	WPD kPa		Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa	Output kW	Input kW	HE kW	LWT C	COP W/W	WPD kPa
15	2.21	7.66	15	79.79	11.37	68.42	23.54	7.02	7.66	82.56	11.36	71.20	20.83	7.27	23.87	85.97	11.80	74.17	19.60	7.29	43.00
			20	75.47	12.73	62.74	28.21	5.93	7.10	78.00	12.72	65.28	25.60	6.13	22.88	81.10	13.08	68.02	24.40	6.20	41.10
			25	77.22	13.79	63.43	33.29	5.60	6.65	79.79	13.78	66.01	30.65	5.79	22.04	82.51	13.79	68.72	29.42	5.98	39.63
			30	74.00	14.63	59.37	38.03	5.06	6.27	76.41	14.63	61.78	35.47	5.22	21.23	78.92	14.61	64.31	34.27	5.40	38.42
			35	73.64	15.66	57.98	42.04	4.70	5.92	75.95	15.65	60.30	40.40	4.85	20.42	78.41	15.64	62.77	39.22	5.01	37.32
			40	70.61	17.18	53.43	47.70	4.11	5.62	72.73	17.17	55.56	45.24	4.24	19.64	74.98	17.16	57.82	44.08	4.37	36.43
			45	69.97	18.61	51.36	52.63	3.76	5.39	72.05	18.60	53.45	50.18	3.87	18.92	74.19	18.58	55.61	49.03	3.99	35.85
			50	68.64	20.12	48.52	57.54	3.41	5.12	70.59	20.11	50.48	55.11	3.51	18.06	72.62	20.09	52.53	53.98	3.61	35.16
	3.34	23.87	15	82.34	11.45	70.89	23.81	7.19	7.66	85.79	11.86	73.93	21.06	7.23	23.87	88.95	11.81	77.14	19.75	7.53	43.00
			20	77.83	12.82	65.01	28.47	6.07	7.10	81.07	13.29	67.78	25.82	6.10	22.88	83.83	13.09	70.74	24.55	6.40	41.10
			25	79.82	13.87	65.95	33.56	5.75	6.65	82.61	13.87	68.74	30.84	5.96	22.04	85.59	13.88	71.71	29.58	6.17	39.63
			30	76.44	14.72	61.72	38.29	5.19	6.27	79.06	14.71	64.35	35.65	5.37	21.23	81.82	14.71	67.11	34.43	5.56	38.42
			35	76.25	15.75	60.50	43.21	4.84	5.92	78.78	15.74	63.04	40.60	5.01	20.42	81.48	15.74	65.74	39.38	5.18	37.32
			40	73.01	17.27	55.74	47.97	4.23	5.62	75.35	17.26	58.09	45.42	4.37	19.64	77.83	17.26	60.57	44.24	4.51	36.43
			45	72.23	18.67	53.56	52.85	3.87	5.39	74.47	18.66	55.81	50.34	3.99	18.92	76.86	18.66	58.20	49.16	4.12	35.85
			50	70.78	20.18	50.60	57.78	3.51	5.12	72.89	20.17	52.72	55.27	3.61	18.06	75.16	20.17	54.99	54.11	3.73	35.16
	4.42	43.00	15	83.56	11.49	72.07	23.94	7.27	7.66	87.06	11.86	75.20	21.15	7.34	23.87	90.35	11.81	78.54	19.83	7.65	43.00
			20	78.96	12.87	66.09	28.59	6.14	7.10	82.25	13.29	68.96	25.90	6.19	22.88	85.11	13.09	72.02	24.62	6.50	41.10
			25	81.06	13.91	67.15	33.69	5.83	6.65	83.97	13.90	70.07	30.94	6.04	22.04	87.10	13.93	73.17	29.66	6.25	39.63
			30	77.62	14.77	62.85	38.41	5.26	6.27	80.35	14.77	65.58	35.74	5.44	21.23	83.22	14.75	68.47	34.50	5.64	38.42
			35	79.91	15.80	64.11	43.58	5.06	5.92	80.19	15.78	64.41	40.69	5.08	20.42	83.01	15.78	67.23	39.46	5.26	37.32
			40	76.39	17.32	59.07	48.33	4.41	5.62	76.68	17.32	59.36	45.52	4.43	19.64	79.26	17.32	61.94	44.31	4.58	36.43
			45	73.33	18.71	54.62	52.96	3.92	5.39	75.65	18.69	56.96	50.42	4.05	18.92	78.16	18.68	59.48	49.23	4.18	35.85
			50	71.82	20.22	51.60	57.87	3.55	5.12	74.03	20.21	53.82	55.35	3.66	18.06	76.39	20.20	56.19	54.18	3.78	35.16
20	2.21	7.10	15	83.48	11.49	71.99	23.93	7.27	7.66	86.43	11.47	74.96	21.10	7.54	23.87	89.93	11.81	78.12	19.81	7.61	43.00
			20	78.89	12.87	66.02	28.59	6.13	7.10	81.58	12.85	68.73	25.86	6.35	22.88	84.73	13.09	71.64	24.60	6.47	41.10
			25	81.37	13.93	67.44	33.72	5.84	6.65	84.11	13.91	70.20	30.95	6.05	22.04	87.06	13.94	73.12	29.66	6.25	39.63
			30	77.90	14.78	63.12	38.44	5.27	6.27	80.49	14.78	65.71	35.75	5.45	21.23	83.20	14.76	68.44	34.50	5.64	38.42
			35	78.35	15.82	62.53	43.43	4.95	5.92	80.85	15.81	65.04	40.74	5.11	20.42	83.52	15.80	67.72	39.48	5.29	37.32
			40	74.98	17.36	57.62	48.18	4.32	5.62	77.28	17.35	59.93	45.56	4.45	19.64	23.58	17.34	6.24	44.34	1.36	36.43
			45	74.54	18.74	55.80	53.09	3.98	5.39	76.81	18.73	58.08	50.49	4.10	18.92	79.18	18.72	60.46	49.28	4.23	35.85
			50	72.98	20.26	52.72	58.00	3.60	5.12	75.11	20.25	54.86	55.43	3.71	18.06	77.35	20.24	57.11	54.23	3.82	35.16
	3.34	22.88	15	85.92	11.58	74.34	24.19	7.42	7.66	89.42	11.87	77.55	21.31	7.53	23.87	92.76	11.81	80.95	19.95	7.85	43.00
			20	81.13	12.96	68.17	28.83	6.26	7.10	84.40	13.29	71.11	26.06	6.35	22.88	87.34	13.10	74.24	24.74	6.67	41.10
			25	83.94	14.02	69.92	33.98	5.99	6.65	86.92	14.02	72.90	31.14	6.20	22.04	90.10	14.03	76.07	29.81	6.42	39.63
			30	80.33	14.89	65.44	38.70	5.39	6.27	83.11	14.88	68.23	35.94	5.59	21.23	86.06	14.86	71.20	34.65	5.79	38.42
			35	81.04	15.93	65.11	43.70	5.09	5.92	83.79	15.92	67.87	40.94	5.26	20.42	86.68	15.90	70.78	39.65	5.45	37.32
			40	77.46	17.47	59.99	48.45	4.43	5.62	79.99	17.46	62.53	45.75	4.58	19.64	82.66	17.45	65.21	44.50	4.74	36.43
			45	76.86	18.82	58.04	53.32	4.08	5.39	79.29	18.80	60.49	50.66	4.22	18.92	81.90	18.80	63.10	49.42	4.36	35.85
			50	75.17	20.34	54.83	58.22	3.70	5.12	77.47	20.33	57.14	55.59	3.81	18.06	79.94	20.33	59.61	54.36	3.93	35.16
	4.42	41.10	15	87.07	11.62	75.45	24.31	7.49	7.66	90.63	11.88	78.75	21.40	7.63	23.87	94.08	11.82	82.26	20.02	7.96	43.00
			20	82.20	13.01	69.19	28.95	6.32	7.10	85.50	13.29	72.21	26.14	6.43	22.88	88.54	13.10	75.44	24.81	6.76	41.10
			25	85.14	14.07	71.07	34.11	6.05	6.65	88.23	14.06	74.17	31.23	6.28	22.04	91.56	14.09	77.47	29.89	6.50	39.63
			30	81.45	14.93	66.52	38.83	5.46	6.27	84.35	14.93	69.42	36.03	5.65	21.23	87.42	14.92	72.50	34.72	5.86	38.42
			35	84.88	15.97	68.91	44.10	5.31	5.92	85.23	15.97	69.26	41.04	5.34	20.42	88.28	15.96	72.32	39.73	5.53	37.32
			40	81.01	17.52	63.49	48.83	4.62	5.62	81.35	17.52	63.83	45.85	4.64	19.64	84.15	17.52	66.63	44.57	4.80	36.43
			45	77.96	18.85	59.11	53.43	4.14	5.39	80.52	18.85	61.67	50.74	4.27	18.92	83.23	18.84	64.39	49.49	4.42	35.85
			50	76.22	20.38	55.84	58.34	3.74	5.12	78.64	20.38	58.26	55.67	3.86	18.06	81.21	20.37	60.84	54.43	3.99	35.16

LEGEND

COP — Coefficient of Performance
EWT — Entering Water Temperature (C)
HE — Heat of Extraction (kW)
LWT — Leaving Water Temperature (C)
WPD — Water Pressure Drop (kPa)

NOTES:

1. Interpolation is permissible, extrapolation is not.
2. For operation in the shaded area when water is used in lieu of an antifreeze solution, the LWT (leaving water temperature) must be calculated. Flow must be maintained to a level so that the LWT is maintained above 6 C when the JW3 jumper is not clipped. Because the refrigerant temperature can potentially reach as low as 0° C with 4 C LWT, a nuisance cut-out could occur due to the activation of the low temperature protection. The JW3 jumper should never be clipped for standard range equipment or systems without antifreeze.
3. All entering air conditions are 27 C DB and 19 C WB in cooling and 20 C DB in heating.
4. Table does not reflect fan or pump power corrections for AHRI/ISO conditions.
5. All performance data is based upon the lower voltage of dual voltage rated units.
6. Performance stated is at the rated power supply; performance may vary as the power supply varies from the rated.
7. Operation below 4 C EWT is based upon a 15% methanol antifreeze solution.
8. Operation below 16 C EWT requires optional insulated water/refrigerant circuit.
9. See performance correction tables for operating conditions other than those listed above.

Application data

Utilize Aquazone™ products to provide optimal energy efficient solutions in the most challenging design applications. Aquazone water source heat pump products are available in several models, which can be used in water loop, ground water, and ground loop systems.

AQUAZONE PRODUCT GUIDE

50 SERIES	TYPE SIZE (tons)	APPLICATION
50HQP,VQP	Large Capacity 6-10 (HQP) 7-25 (VQP)	Environmentally sound unit with Puron® refrigerant (R-410A) designed to handle large zoned areas for all geothermal and boiler/tower applications.
50PC	Compact $1^1/_4$-5	Compact WSHP with Puron refrigerant (R-410A) for boiler/tower, ground water, or ground loop systems.
50PS	Premium Efficiency $^1/_2$-6	Premium, ultra efficient unit with Puron refrigerant (R-410A) for new boiler/tower, ground water, or ground loop systems.
50PEC	High Efficiency Console $^3/_4$-$1^1/_2$	Efficient console unit with Puron refrigerant (R-410A) and attractive design for finished interior, under-window installations.
50PT	Premium Efficiency 2-6	Premium, ultra efficient 2-stage unit with Puron refrigerant (R-410A) for new boiler/tower, ground water, or ground loop systems.
50PSW	Water-to-Water 3-30	Efficient unit with Puron refrigerant (R-410A) serves as an alternative to preheat or cool air. Unit can be used as a stand-alone or supplemental boiler/chiller in most hydronic heating applications. Also conditions process fluids, lubricants, and refrigerants.
50RTP	Rooftop 3-20	Economical solution for indoor air quality (IAQ) problems and tempering ventilation air.
50VS	Premium Efficiency Vertical Stack Heat Pump $^3/_4$ to 3 Tons	Ultra efficient unit with environmentally sound Puron refrigerant (R-410A) for boiler/tower and geothermal applications (condominiums, hotels, etc.). Stacked design allows for common piping and simplistic design.

Water loop system

Water loop (or boiler/tower) system applications typically include a number of units plumbed to a common piping system. For optimal performance, this system should be designed between 2.9 and 3.9 L/s per kW of cooling capacity. The system is comprised of highly efficient packaged reverse cycle heat pump units interconnected by a water loop. The water circuit serves as both a sink and source for heat absorption and rejection and is designed for entering water temperatures between 15 C and 35 C. Within this temperature range, units can heat or cool as required from the same water source. Transferring heat from warm to cold spaces in the building conserves energy rather than creating new heat.

Refer to the Carrier Water Source Heat Pump System Design Guide for assistance with the design of water loop systems. The guide includes a practical approach for the latest and most current design recommendations including:

- Product application including horizontal, vertical, console, rooftop, and water-to-water applications.
- Ventilation methods and system design including energy recovery.
- Acoustical considerations for different product types.
- Addressing IAQ (indoor air quality) issues such as condensate removal and humidity control.
- Air distribution design including diffuser selection/layout and ductwork design.
- Hydronic system design including pipe sizing/layout and boiler/tower sizing.
- Control configurations such as stand-alone, DDC, DCV, and VVT® (variable volume and temperature).
- WSHP Efficiency/Operational Cost Comparison charts.
- System applications such as a system without a boiler, variable pumping, and VAV (variable air volume) for interior use.

Ground water systems

To utilize Aquazone units in ground water applications, extended range should be specified. This will provide factory-installed insulation on the coaxial coil to prevent condensate from dripping when entering-water temperatures are below 15 C. The standard copper coaxial coil on the Aquazone units may not be suitable for certain water conditions. Refer to the Water Conditioning section for proper coaxial coil material selection.

Surface water system — This system is typically located near a lake or pond. In this application, the loop can be submerged in a series of coils beneath the water surface. The number of coils required depends on system load and design. This application requires minimum piping and excavation.

Open loop system — This system is used where ground water is plentiful. In this application, ground water is pumped through supply piping from the well to the building. The water is then pumped back into the ground through a discharge well as it leaves the building. An additional heat exchanger is usually installed between the building water piping system and the ground water piping system. This design limits the amount of piping and excavation required.

Aquazone units are provided with a standard TXV and are rated to extremely low temperatures to self-adjust the refrigeration circuit, therefore water regulating valves are not required on open loop systems. To conserve water on this type of system, a slow opening/closing solenoid valve is recommended.

Ground loop systems

There are many commonly specified designs for ground loop applications. Typical designs include vertical loops and horizontal loops. In some applications, water is piped from the ground or lake directly to the water source heat pump. Piping is limited to the amount of pipe required to get the water from the source to the unit.

NOTE: When utilizing Aquazone water source heat pumps in ground loop systems, refer to design considerations in the ground water system section.

Horizontal ground loop — This system is used when adequate space is available and trenching can be easily accomplished. A series of parallel pipes are laid out in trenches 1 to 2 m below the ground surface and then back-filled. Multiple pipes are often used to maximize the heat transfer capability of each trench. The amount of pipe and the size of the ground loop field are based on ground conditions, heating, and cooling requirements of the application and system design.

Vertical ground loop — This system is used in vertical borehole applications. This design is well suited for retrofit applications where there are space limitations or where landscaping is already complete and minimum disruption of the site is desired. The vertical ground loop system contains a single loop of pipe inserted into a hole. The hole is back-filled and grouted after the pipe is inserted. The completed loop is concealed below ground. The number of loops required depends on ground conditions, heating and cooling requirements, and the depth of each hole.

Application data (cont)

Hybrid systems — In some applications, it may be beneficial to incorporate a cooling tower into the ground loop system to reduce the overall cost. A hybrid system discards excess heat into the air and increases the cooling performance of the ground loop.

Water conditioning

In some applications, maintaining proper water quality may require the use of higher corrosion protection for the water-to-refrigerant heat exchanger. Water quality varies from location to location and is unique for each job. Water characteristics such as pH value, alkalinity, hardness, and specific conductance are of importance when considering any WSHP application. Water typically includes impurities and hardness that must be removed. The required treatment will depend on the water quality as well as type of system. Water problems fall into the following three main categories.

1. Scale formation caused by hard water reduces the heat transfer rate and increases the water pressure drop through the heat exchanger. As water is heated, minerals and salts are precipitated from a solution and deposited on the inside surface of the pipe or tube.
2. Corrosion is caused by absorption of gases from the air coupled with water on exposed metal. Corrosion is also common in salt-water areas.
3. Organic growths such as algae can reduce the heat transfer rate by forming an insulating coating on the inside tube surface. Algae can also promote corrosion by pitting.

NOTE: In most commercial water loop applications, Aquazone™ WSHP units use a copper water-to-refrigerant heat exchanger. Units can also be equipped with a cupronickel heat exchanger for applications where water is outside the standard contaminant limits for a copper heat exchanger.

WATER QUALITY GUIDELINES

CONDITION	HX MATERIAL*	CLOSED RECIRCULATING†	OPEN LOOP AND RECIRCULATING WELL**		
Scaling Potential — Primary Measurement Above the given limits, scaling is likely to occur. Scaling indexes should be calculated using the limits below.					
pH/Calcium Hardness Method	All	N/A	**pH < 7.5 and Ca Hardness, <100 ppm**		
Index Limits for Probable Scaling Situations (Operation outside these limits is not recommended.)					
Scaling indexes should be calculated at 150 F for direct use and at 90 F for indirect HX use. A monitoring plan should be implemented.					
Ryznar Stability Index	All	N/A	**6.0 - 7.5** If >7.5 minimize steel pipe use.		
Langelier Saturation Index	All	N/A	**–0.5 to +0.5** If <–0.5 minimize steel pipe use. Based upon 150 F HWG and direct well, 85 F indirect well HX.		
Iron Fouling					
Iron Fe^{2+} (Ferrous) (Bacterial Iron Potential)	All	N/A	**<0.2 ppm (Ferrous)** If Fe^{2+} (ferrous) >0.2 ppm with pH 6 - 8, O_2<5 ppm check for iron bacteria.		
Iron Fouling	All	N/A	**<0.5 ppm of Oxygen** Above this level deposition will occur.		
Corrosion Prevention††					
pH	All	6 - 8.5 Monitor/treat as needed.	**6 - 8.5** Minimize steel pipe below 7 and no open tanks with pH <8.		
Hydrogen Sulfide (H_2S)	All	N/A	**<0.5 ppm** At H_2S>0.2 ppm, avoid use of copper and cupronickel piping or HXs. Rotten egg smell appears at 0.5 ppm level. Copper alloy (bronze or brass) cast components are okay to <0.5 ppm.		
Ammonia Ion as Hydroxide, Chloride, Nitrate and Sulfate Compounds	All	N/A	**<0.5 ppm**		
Maximum Chloride Levels			Maximum allowable at maximum water temperature.		
			50 F (10 C)	75 F (24 C)	100 F (38 C)
	Copper	N/A	<20 ppm	NR	NR
	Cupronickel	N/A	<150 ppm	NR	NR
	304 SS	N/A	<400 ppm	<250 ppm	<150 ppm
	316 SS	N/A	<1000 ppm	<550 ppm	<375 ppm
	Titanium	N/A	>1000 ppm	>550 ppm	>375 ppm
Erosion and Clogging					
Particulate Size and Erosion	All	<10 ppm of particles and a maximum velocity of 6 fps. Filtered for maximum 800 micron size.	<10 ppm (<1 ppm "sandfree" for reinjection) of particles and a maximum velocity of 6 fps. Filtered for maximum 800 micron size. Any particulate that is not removed can potentially clog components.		
Brackish	All	N/A	Use cupronickel heat exchanger when concentrations of calcium or sodium chloride are greater than 125 ppm are present. (Seawater is approximately 25,000 ppm.)		

LEGEND

HX — Heat Exchanger
N/A — Design Limits Not Applicable Considering Recirculating Potable Water
NR — Application Not Recommended
SS — Stainless Steel

*Heat exchanger materials considered are copper, cupronickel, 304 SS (stainless steel), 316 SS, titanium.
†Closed recirculating system is identified by a closed pressurized piping system.
**Recirculating open wells should observe the open recirculating design considerations.

††If the concentration of these corrosives exceeds the maximum allowable level, then the potential for serious corrosion problems exists.
Sulfides in the water quickly oxidize when exposed to air, requiring that no agitation occur as the sample is taken. Unless tested immediately at the site, the sample will require stabilization with a few drops of one Molar zinc acetate solution, allowing accurate sulfide determination up to 24 hours after sampling. A low pH and high alkalinity cause system problems, even when both values are within ranges shown. The term pH refers to the acidity, basicity, or neutrality of the water supply. Below 7.0, the water is considered to be acidic. Above 7.0, water is considered to be basic. Neutral water contains a pH of 7.0.
To convert ppm to grains per gallon, divide by 17. Hardness in mg/l is equivalent to ppm.

COAXIAL HEAT EXCHANGER CORROSION RESISTANCE

The resistance guide below is an attempt to give a picture of the corrosion resistance of stainless steel of type **AISI 316** and pure **Copper** (99.9%) in water to a number of important chemical factors. The actual corrosion is, however, a very complex process influenced by many different factors in combination. This table is a considerable simplification and should not be overvalued.

CHEMICAL FACTORS:	CONCENTRATION (mg/l or ppm)	TIME LIMITS ANALYZE	AISI 316 STAINLESS STEEL	COPPER	CUPRONICKEL
Alkalinity (HCO_3^-)	<70 70-300 >300	Within 24 Hours	+ + +	0 + 0/+	+ + +
Sulfate (SO_4^{2-})	<70 70-300 >300	No limit	+ + 0	+ 0/– –	+ + +
HCO_3^-/ SO_4^{2-}	>1.0 <1.0	No limit	+ +	+ 0/–	+ +
Electrical Conductivity	<10 mS/cm 10 - 500 mS/cm >500 mS/cm	No limit	+ + +	0 + 0	+ + +
pH	<6.0 6.0-7.5 7.5-8.5 >8.5	Within 24 Hours	0 + + +	0 0 + 0	+ + + +
Ammonium (NH_4^+)	<2 2-20 >20	Within 24 Hours	+ + +	+ 0 –	+ + +
Chlorides (Cl) **Please see Chloride Content table.**	<20 >20	No limit	+ +	+ 0/+	+ +
Free Chlorine (Cl_2)	<1 1-5 >5	Within 5 hours	+ + +	+ 0 0/–	+ + +
Hydrogen Sulfide (H_2S)	<0.5 >0.5	No limit	+ +	+ 0/–	+ +
Free (aggressive) **Carbon Dioxide (CO_2)**	<5 5-20 >20	No limit	+ + +	+ 0 –	+ + +
Total Hardness (°dH)	4.0 - 8.5	No limit	+	+	+
Nitrate (NO_3)	<100 >100	No limit	+ +	+ 0	+ +
Iron (Fe)	<0.2 >0.2	No limit	+ +	+ 0	+ +
Aluminum (Al)	<0.2 >0.2	No limit	+ +	+ 0	+ +
Manganese (Mn)	<0.1 >0.1	No limit	+ +	+ 0	+ +

LEGEND

AISI — American Iron and Steel Institute
+ — Good resistance under normal conditions
0 — Corrosion problems may occur especially when more factors are valued 0
– — Use is not recommended

CHLORIDE CONTENT

CHLORIDE CONTENT	MAXIMUM TEMPERATURE OF WATER LOOP			
	60° C	80° C	120 ° C	130 ° C
= 10 ppm	SS 304	SS 304	SS 304	SS 316
= 25 ppm	SS 304	SS 304	SS 316	SS 316
= 50 ppm	SS 304	SS 316	SS 316	Ti/SS 316
= 80 ppm	SS 316	SS 316	SS 316	Ti/SS 316
= 150 ppm	SS 316	SS 316	Ti/SS 316	Ti/SS 316
= 300 ppm	SS 316	Ti/SS 316	Ti/SS 316	Ti/SS 316
> 300 ppm	Ti/SS 316	Ti/SS 316	Ti/SS 316	Ti/SS 316

LEGEND

SS — Stainless Steel
Ti — Titanium

NOTE: Titanium is not an available option for the 50PSW unit. It is shown here for comparative purposes.

Application data (cont)

Solenoid valves

In applications using variable flow pumping, solenoid valves can be field installed and operated from the control board in the Aquazone™ WSHP unit.

Freeze protection

Application systems exposed to outdoor temperatures below freezing (0° C) must be protected from freezing. The most common method of protecting water systems from freezing is adding glycol concentrations into the water. Design care should be used when selecting both the type and concentrations of glycol utilized due to the following:

- Equipment and performance may suffer with high concentrations of glycol and other antifreeze solutions.
- Loss of piping pressure may increase greatly, resulting in higher pumping costs.
- Higher viscosity of the mixture may cause excess corrosion and wear on the entire system.
- Acidity of the water may be greatly increased, promoting corrosion.
- Glycol promotes galvanic corrosion in systems of dissimilar metals. The result is corrosion of one metal by the other, causing leaks.

ANTIFREEZE CORRECTION TABLE

ANTIFREEZE TYPE	%	COOLING EWT 32 C			HEATING EWT –1 C		WPD EWT –1 C
		TC	SC	Power	HC	Power	
Water	0	1.000	1.000	1.000	1.000	1.000	1.000
Propylene Glycol	5	0.995	0.995	1.003	0.989	0.997	1.070
	15	0.986	0.986	1.009	0.968	0.990	1.210
	25	0.978	0.978	1.014	0.947	0.983	1.360
Methanol	5	0.997	0.997	1.002	0.989	0.997	1.070
	15	0.990	0.990	1.007	0.968	0.990	1.160
	25	0.982	0.982	1.012	0.949	0.984	1.220
Ethanol	5	0.998	0.998	1.002	0.981	0.994	1.140
	15	0.994	0.994	1.005	0.944	0.983	1.300
	25	0.986	0.986	1.009	0.917	0.974	1.360
Ethylene Glycol	5	0.998	0.998	1.002	0.993	0.998	1.040
	15	0.994	0.994	1.004	0.980	0.994	1.120
	25	0.988	0.988	1.008	0.966	0.990	1.200

LEGEND

EWT — Entering Water Temperature
HC — Heating Capacity
SC — Sensible Capacity
TC — Total Capacity
WPD — Water Pressure Drop

Source vs. load heat exchanger

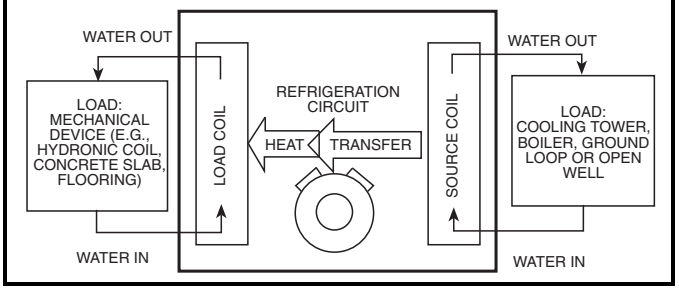
Both the load and source heat exchangers are water-to-refrigerant heat exchangers. The water for the source heat exchanger is supplied from a ground loop, open loop (well water), or water loop (boiler/tower) system. Heat from the refrigeration circuit is exchanged between the load and source heat exchangers. The water for the load heat exchanger can be used in many applications to provide chilled or hot water for air-handling units, fan coils, hydronic baseboards, radiant in-slab piping, or swimming pools.

Parallel operation

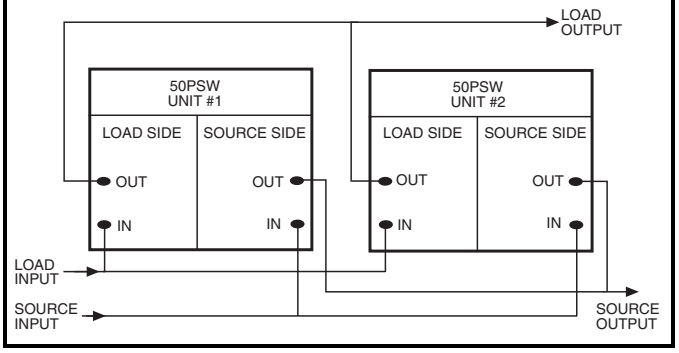
Multiple units can be piped in a parallel operation to satisfy heating and/or cooling loads that cannot be accomplished from a single 50PSW water-to-water unit.

Cycling one or more of the units on or off will provide capacity control through staging of multiple unit combinations. In a parallel operation, the total pressure drop through the load heat exchanger of multiple units is the same as the drop through a single unit.

SOURCE VS. LOAD HEAT EXCHANGER



PARALLEL OPERATION



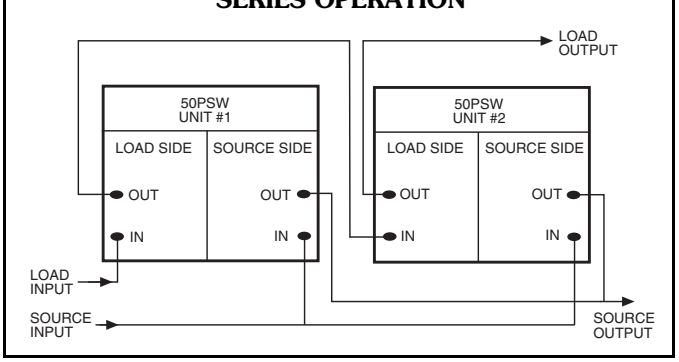
Series operation

Multiple units can be piped in a series type operation to satisfy lower cooling leaving water temperature.

In a series operation, the leaving load water temperature of the first unit becomes the load entering water temperature of the second unit. This arrangement provides an additional decrease in water temperature beyond the capability of a single unit. For example, a typical drop of 5.5 C to 8.3 C can be accomplished with one 50PSW unit. When 2 or more units are piped in series, the water temperature drop ranges between 11.1 C and 13.9 C. Capacity control is provided by cycling one or more of the units on or off to provide staging of the leaving water temperature from the units.

When the load coils are piped in series, the total water pressure drop through the load heat exchanger of the units should include both units. This is a consideration when sizing the overall system, since an increase in pump horsepower may be required.

SERIES OPERATION



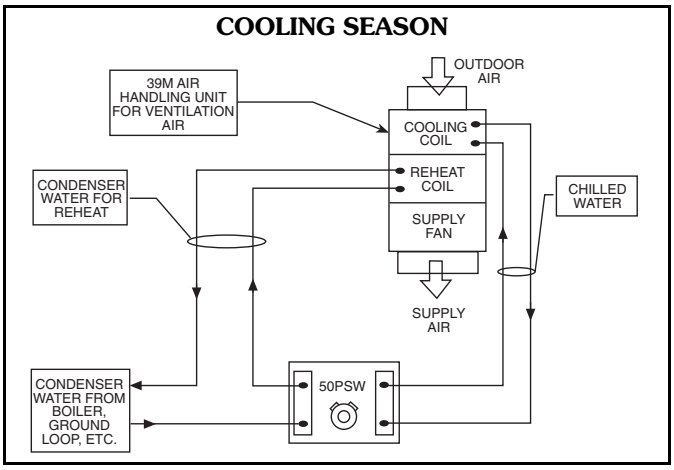
Tempering ventilation air in air handlers

The load heat exchanger in a water-to-water unit provides chilled water during the cooling season and hot water during the heating season. The source heat exchanger is used to provide warm water for ventilation air reheat during the cooling season. In the heating season, the source heat exchanger uses heat from building exhaust to efficiently produce hot water for heating ventilation air in the air-handling unit. The cooling and heating systems can be either piped together for tempering ventilation air as part of an overall integrated system with water-to-water units, or implemented separately depending on the particular design requirements for the ventilation air system.

NOTE: Depending on the system hydronic design, circulation pumps may be required for the source and load of the water-to-water heat pumps in both heating and cooling season operations.

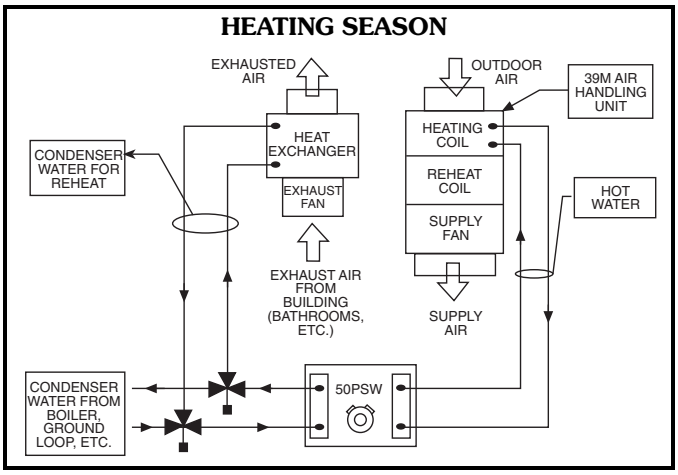
Cooling season

On the load side of the 50PSW unit, chilled water is circulated to the air-handling unit where it cools and dehumidifies ventilation air. The water absorbs heat from the ventilation air and returns to the 50PSW unit, where the heat is removed via the refrigeration circuit and then transferred to the source heat exchanger. Heated water from the source heat exchanger is used to reheat air in the ventilation unit. The heat is then absorbed from the water by the air in the reheat coil and, if necessary, is returned to the cooling tower, boiler, or ground loop for further heat rejection.



Heating season

Building exhaust heat is used by the water-to-water unit for hot water generation. On the load side of the heat exchanger, hot water is circulated to the air-handling unit for heating ventilation air. As the heat from the water is released to the air, the water is circulated back to the 50PSW unit. On the source side of the unit, water is circulated through the heat recovery coil, picks up heat from the exhaust airstream, and then circulates to the 50PSW unit. A pair of control valves is required to maximize the process of extracting the heat from the exhaust. Control valves on the source heat exchanger supply and return water from the main water loop to minimize (or possibly eliminate) the need for additional heat injection by system boilers.



Hydronic heating/cooling system with storage tank

In some cooling or heating applications, the addition of a storage tank may be necessary. The tank allows hot or chilled water temperatures to fluctuate, allowing the water-to-water heat pump to operate more consistently.

In heating applications, this prevents equipment short cycling and allows different flow rates through the water-to-water unit rather than through the hydronic heating delivery system.

A storage tank is also required for cooling applications if the water-to-water unit is 20% larger than the cooling load and/or multiple fan coil units in the same application.

NOTE: In cooling applications where only one fan coil is utilized, water-to-water units may be able to operate without a storage tank.

The size of the storage tank should be based upon the primary use of the application. For heating, storage tanks should be sized at one U.S. gallon per 1,000 Btuh of heating capacity at the maximum entering source water temperature and the minimum entering load water temperature. For cooling, storage tanks should be sized at one U.S. gallon per 1,000 Btuh of cooling capacity at the minimum entering source water temperature and the maximum entering load water temperature. The selection of the storage tank should be based upon the larger of the heating or cooling calculations.

NOTE: When the water-to-water units do not have sufficient capacity to handle the required heating load, supplementary heating such as electric heat or a boiler may be required.

Snow melting systems

Snow melting systems use water-to-water heat pumps to melt snow and ice. The water-to-water heat pumps circulate hot water through a piping loop in a slab to melt ice and snow. This system is especially energy efficient when coupled with a geothermal ground loop for heat addition/rejection. The size of the water-to-water heat pumps is based on the amount of heat needed to melt the snow across the surface.

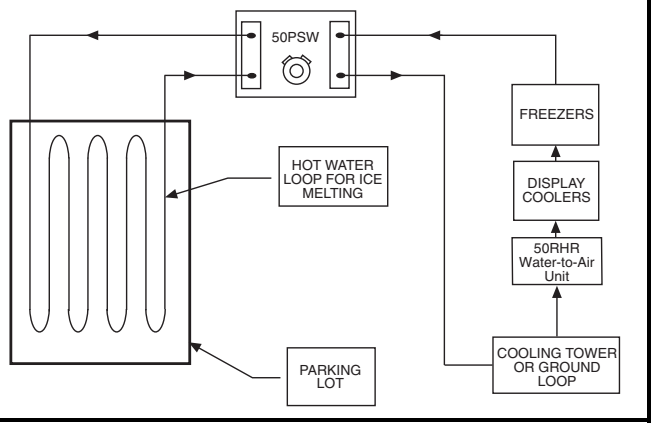
NOTE: Consult the ASHRAE HVAC Applications Handbook for slab piping design and temperature requirements.

Application data (cont)

The 50PSW units can be configured with a field-supplied control system for ice and snow melting. In commercial applications where fast ice removal is required, keeping the slab at a stationary temperature just below the freezing point and then gradually increasing the hot water temperature may reduce melting time.

NOTE: To prevent thermal expansion of the slab due to extreme temperature differences, hot water temperature should be slowly increased.

SNOW MELTING SYSTEMS



50PSW UNIT OPERATING TEMPERATURE LIMITS (C)

BUILDING COMMISSIONING

50PSW UNIT SIZE	COOLING			HEATING		
	Source Min/Max	Load Min/Max	Ambient Min/Max	Source Min/Max	Load Min/Max	Ambient Min/Max
036	10/43	16/27	7/43	–1/27	16/49	4/29
060,120	10/49	16/32	7/43	–1/27	16/49	4/29
180,360	10/32	16/32	7/43	10/21	27/49	4/29

BUILDING OPERATING

50PSW UNIT SIZE	COOLING			HEATING		
	Source Min/Max	Load Min/Max	Ambient Min/Max	Source Min/Max	Load Min/Max	Ambient Min/Max
036	10/49	10/32	7/43	–7/27	16/54	4/29
060,120	10/49	10/32	7/43	–7/27	16/54	4/29
180,360	10/43	10/32	7/43	–7/21	16/49	4/29

WATER TEMPERATURE CHANGE (C) THROUGH HEAT EXCHANGER

WATER FLOW RATE (L/m)	RISE (C) (Cooling)	DROP (C) (Heating)
For Closed Loop: Ground Source or Cooler/Boiler Systems at 3.2 L/m per kW	5.0-6.7	2.2-4.4
For Open Loop: Ground Water Systems at 1.6 L/m per kW	11.1-14.4	5.6-9.4

COAX WATER PRESSURE DROP

UNIT SIZES 036-120

50PSW UNIT SIZE	L/s	PRESSURE DROP (kPa)			
		–1 C	10 C	21 C	32C
Source/Outdoor Coax					
036	0.28	**11.7**	9.0	6.9	5.5
	0.43	**28.3**	23.4	19.3	16.5
	0.57	**49.0**	41.4	35.2	31.0
060	0.47	**10.3**	9.0	17.2	14.5
	0.71	**27.6**	23.4	47.6	42.1
	0.95	**47.6**	42.8	88.3	80.0
120	0.95	**11.7**	9.7	8.3	6.2
	1.42	**30.3**	26.2	22.8	18.6
	1.89	**52.4**	46.9	42.1	34.5
Load/Outdoor Coax					
036	0.28	—	4.1	3.4	2.1
	0.43	—	9.7	9.0	7.6
	0.57	—	18.0	16.5	15.2
060	0.47	—	9.7	9.0	8.3
	0.71	—	24.1	22.1	20.7
	0.95	—	42.8	40.0	37.9
120	0.95	—	11.0	9.7	2.1
	1.42	—	26.2	24.1	22.8
	1.89	—	46.9	44.1	41.1

UNIT SIZES 180,360

50PSW UNIT SIZE	L/s	PRESSURE DROP (kPa)			
		0 C	10 C	20 C	30C
Source/Outdoor Coax					
180	1.10	4.82	2.76	1.72	0.88
	1.67	17.92	11.72	11.38	9.47
	2.21	32.40	22.75	21.37	19.30
360	2.21	11.03	8.27	7.22	6.29
	3.34	26.88	24.82	23.10	21.29
	4.42	48.95	44.82	41.36	38.47

NOTE: Bold values indicate use of antifreeze is required.

Electrical data

50PSW UNIT SIZE	VOLTAGE (V-Ph-Hz)	VOLTAGE RANGE MIN/MAX	COMPRESSOR			TOTAL FLA	MCA	MOCP*
			RLA	LRA	QTY			
036	220/240-1-50	198/264	13.5	67	1	13.5	16.9	30
	380/420-3-50	342/462	5.4	38	1	5.4	6.8	15
060	220/240-1-50	198/264	24.5	153	1	24.5	30.6	50
	380/420-3-50	342/462	9.6	74	1	9.6	12.0	20
120	220/240-1-50	198/264	24.5	153	2	49.0	55.1	79.6
	380/420-3-50	342/462	9.6	74	2	19.2	21.6	30
180	220/240-1-50	198/264	44.9	273	1	44.9	56.1	100
	380/420-3-50	342/462	18.6	118	1	18.6	23.3	40
360	220/240-1-50	198/264	44.9	273	2	89.8	101	125
	380/420-3-50	342/462	18.6	118	2	37.2	46.6	60

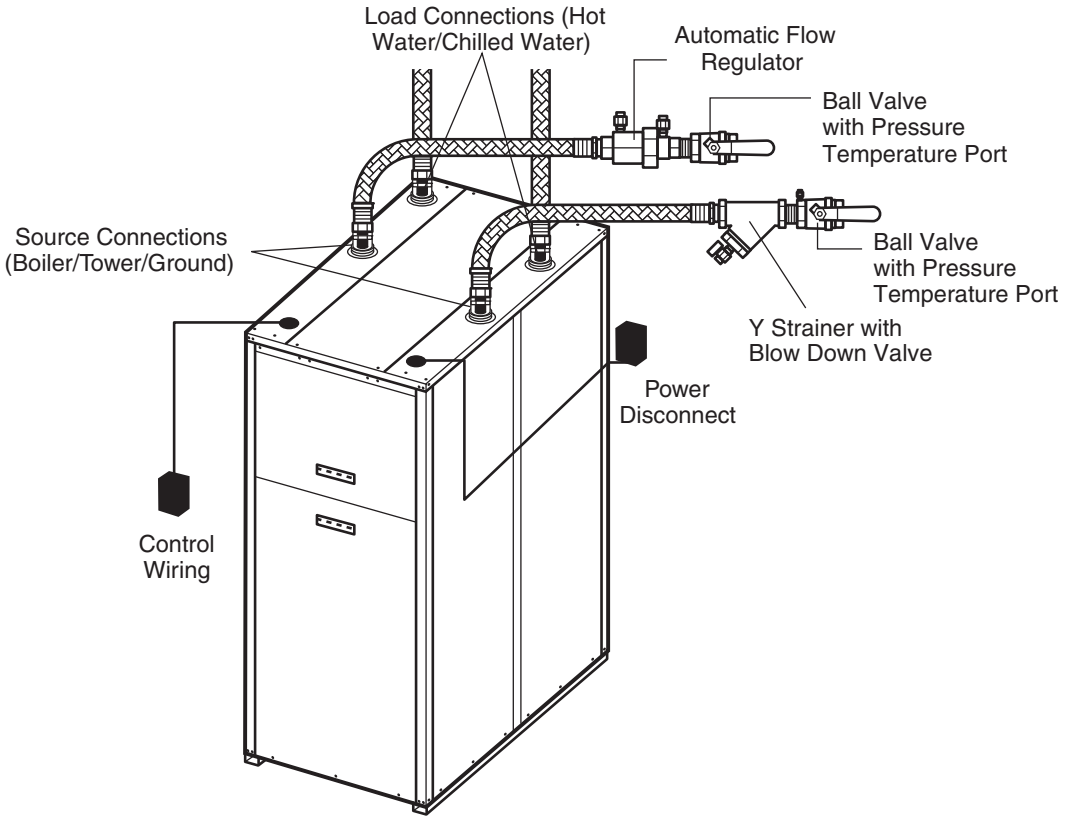
LEGEND

FLA — Full Load Amps
HACR — Heating, Air Conditioning, and Refrigeration
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Minimum Overcurrent Protection
RLA — Rated Load Amps

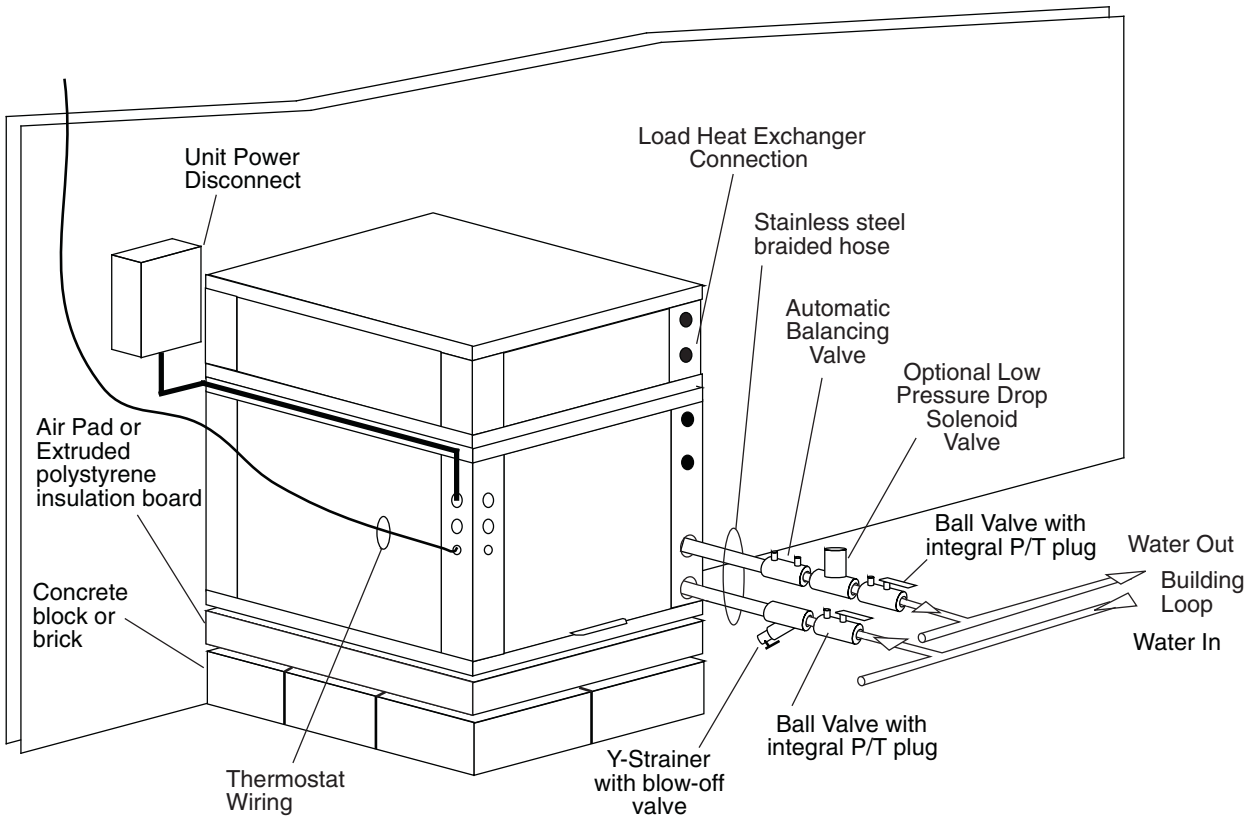
*Time-delay fuse or HACR circuit breaker.

Typical piping and wiring

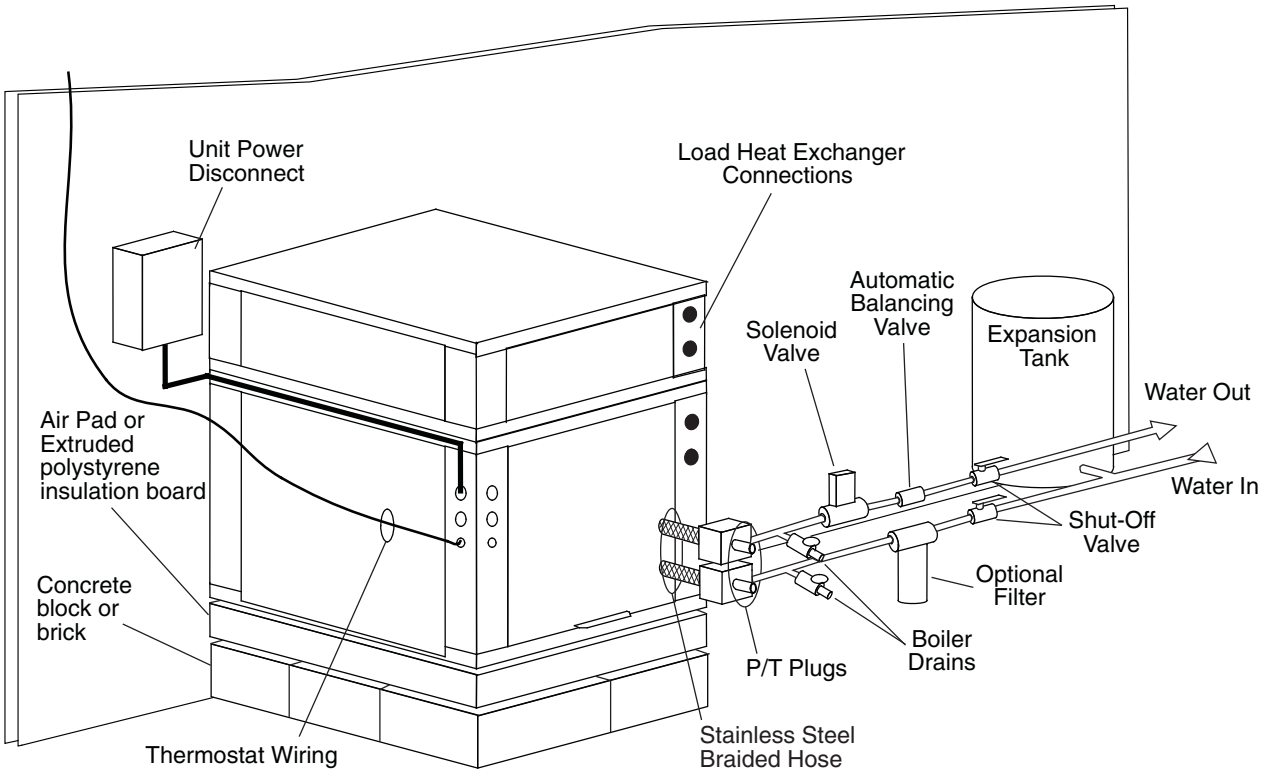
TYPICAL WATER LOOP (BOILER/TOWER/GROUND) SYSTEM


Load Connections (Hot Water/Chilled Water)
Automatic Flow Regulator
Ball Valve with Pressure Temperature Port
Source Connections (Boiler/Tower/Ground)
Ball Valve with Pressure Temperature Port
Y Strainer with Blow Down Valve
Power Disconnect
Control Wiring

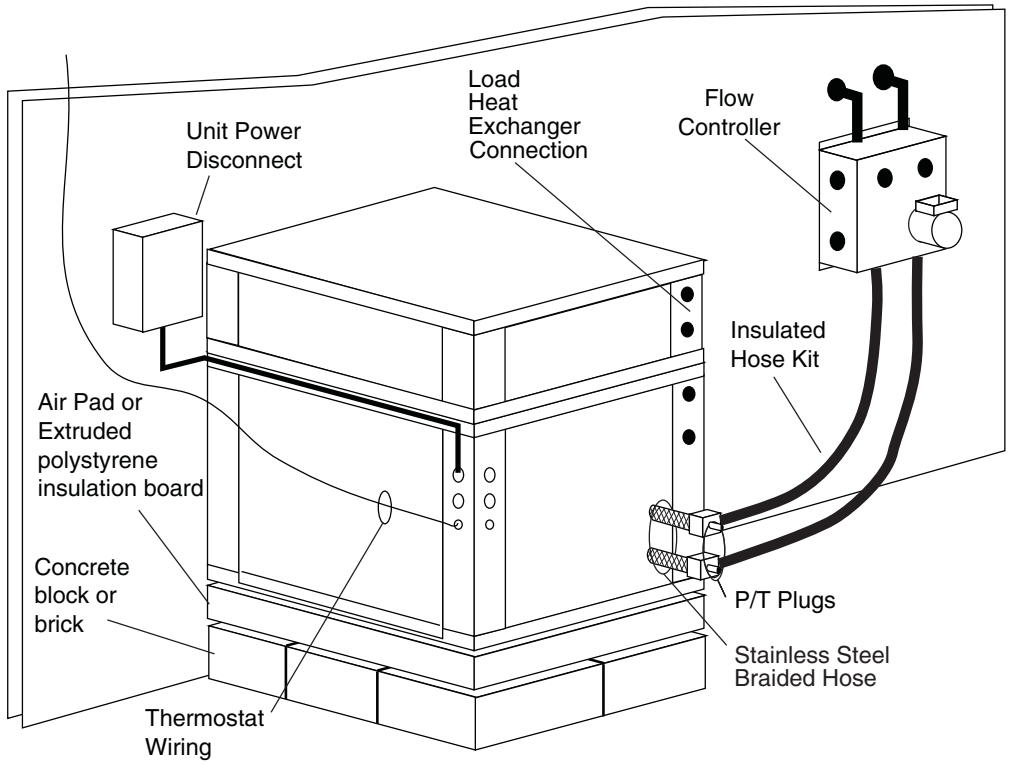
TYPICAL WATER LOOP (BOILER/TOWER) SYSTEM



TYPICAL GROUND WATER SYSTEM



TYPICAL GROUND LOOP SYSTEM



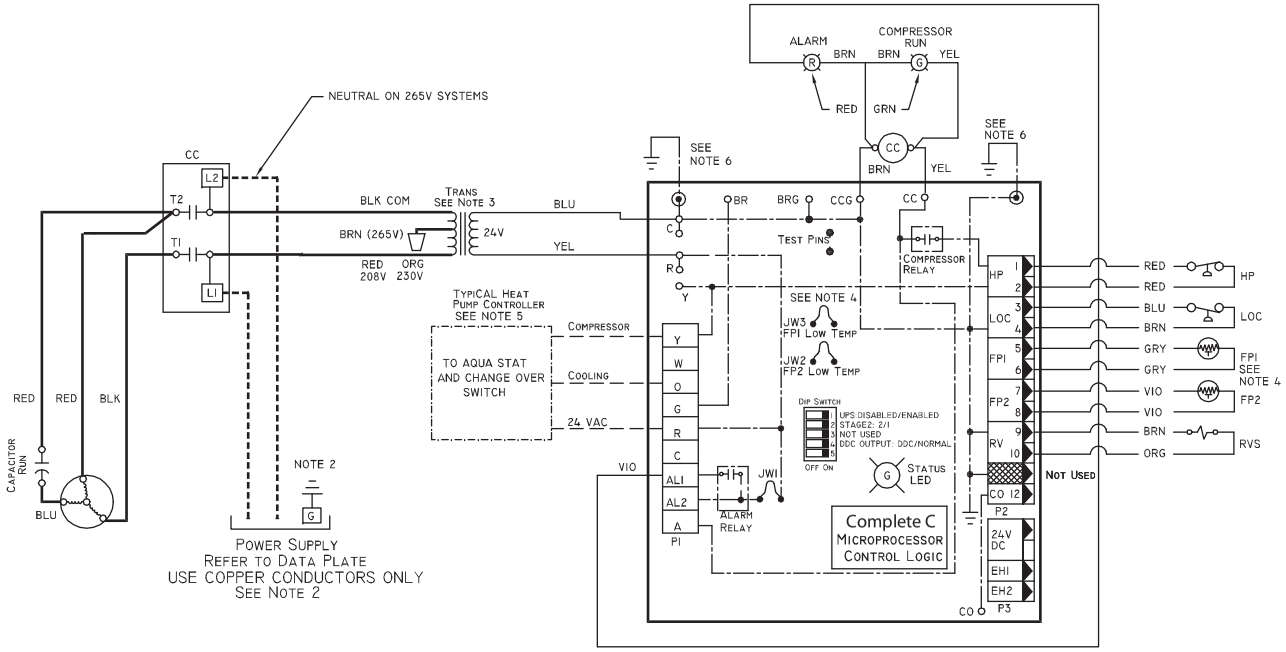
TYPICAL AQUAZONE™ 50PSW036-060 COMPLETE C CONTROL WIRING, SINGLE-PHASE

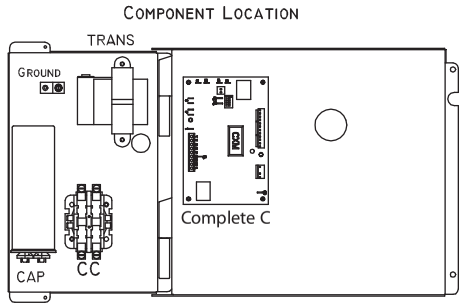
LEGEND

AL	—	Alarm Relay Contacts
CC	—	Compressor Contactor
FP1	—	Sensor, Source Low Temp Protection
FP2	—	Sensor, Load Low Temp Protection
HP	—	High Pressure Switch
JW1	—	Jumper Wire for Alarm
LED	—	Light-Emitting Diode
LOC	—	Loss of Charge Pressure Switch
NEC	—	National Electrical Code
P1	—	Field Wiring Terminal Block
RVS	—	Reversing Valve Solenoid
TRANS	—	Transformer

Factory Line Voltage Wiring
Factory Low Voltage Wiring
Field Line Voltage Wiring
Field Low Voltage Wiring
Printed Circuit Trace
Relay/Contactor Coil
Solenoid Coil
Thermistor
Ground
Indicator Light
G=Green, R=Red
(Comp On) (Alarm Light)
Circuit Breaker
High Pressure Switch
Low Pressure Switch
Fuse

NOTES:
1. Compressor motor thermally protected internally.
2. All wiring to the unit must comply with NEC and local codes.
3. Transformer is wired to 265 v lead (BRN) for 265-1-50 units. For 220/240 v operation, disconnect BRN lead at L1 and connect ORG lead to L1. Insulate open ends of BRN and RED leads. Transformer is energy limiting or may have circuit breaker.
4. FP1 thermistor provides freeze protection for source water. When using anti-freeze solutions, cut JW3 jumper.
5. Refer to or Thermostat Installation, Application and Operation Manual for control wiring to the unit. Low voltage wiring must be “Class 1” and voltage rating equal to or greater than unit supply voltage.





TYPICAL AQUAZONE™ 50PSW120 COMPLETE C CONTROL WIRING, 3-PHASE

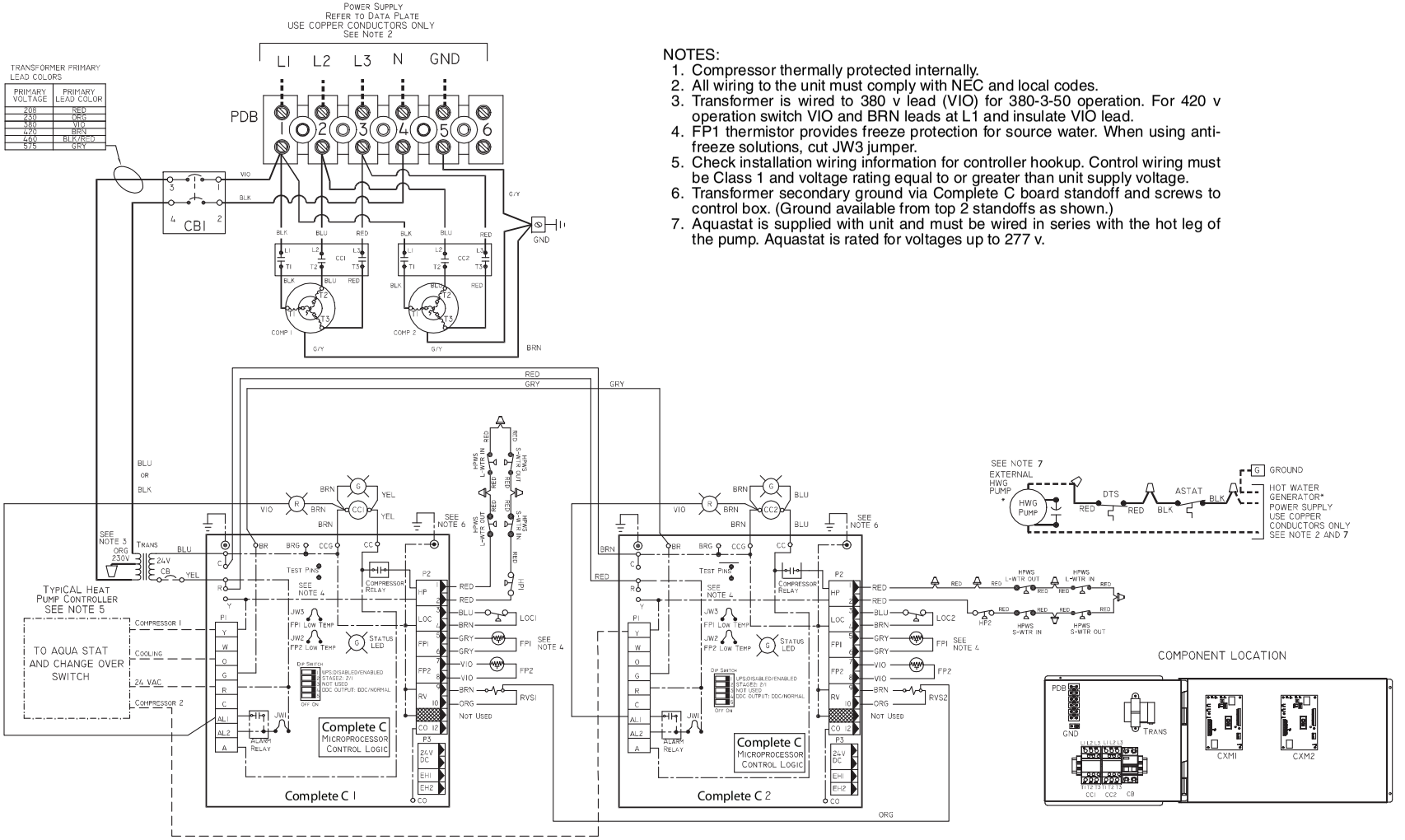
LEGEND

AL	—	Alarm Relay Contacts
ASTAT	—	Aquastat Device
COMP	—	Compressor
CC	—	Compressor Contactor
DTS	—	Discharge Temperature Switch
FP1	—	Sensor, Source Low Temp Protection
FP2	—	Sensor, Load Low Temp Protection
HP	—	High Pressure Switch
HPWS	—	High Pressure Water Switch
HWG	—	Hot Water Generator
JW1	—	Jumper Wire for Alarm
LOC	—	Loss of Charge Pressure Switch
L-WTR	—	Load Water
NEC	—	National Electrical Code
P1	—	Field Wiring Terminal Block
RVS	—	Reversing Valve Solenoid
S-WTR	—	Source Water
TRANS	—	Transformer

Factory Line Voltage Wiring
Factory Low Voltage Wiring
Field Line Voltage Wiring
Field Low Voltage Wiring
Printed Circuit Trace

Relay/Contactor Coil
Solenoid Coil
Thermistor
Ground
Indicator Light
G=Green, R=Red
(Comp On) (Alarm Light)

Circuit Breaker
High Pressure Switch
Low Pressure Switch
Fuse



NOTES:

1. Compressor thermally protected internally.
2. All wiring to the unit must comply with NEC and local codes.
3. Transformer is wired to 380 v lead (VIO) for 380-3-50 operation. For 420 v operation switch VIO and BRN leads at L1 and insulate VIO lead.
4. FP1 thermistor provides freeze protection for source water. When using anti-freeze solutions, cut JW3 jumper.
5. Check installation wiring information for controller hookup. Control wiring must be Class 1 and voltage rating equal to or greater than unit supply voltage.
6. Transformer secondary ground via Complete C board standoff and screws to control box. (Ground available from top 2 standoffs as shown.)
7. Aquastat is supplied with unit and must be wired in series with the hot leg of the pump. Aquastat is rated for voltages up to 277 v.

TYPICAL AQUAZONE™ 50PSW360 COMPLETE C CONTROL WIRING, 3-PHASE

LEGEND

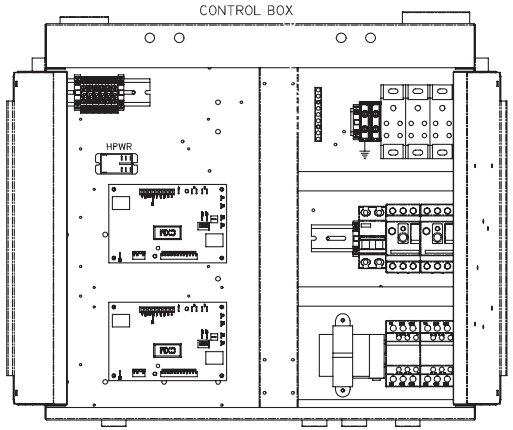
AL	—	Alarm Relay Contacts
COMP	—	Compressor
CC	—	Compressor Contactor
FP1	—	Sensor, Source Low Temp Protection
FP2	—	Sensor, Load Low Temp Protection
HP	—	High Pressure Switch
HPWR	—	High Pressure Water Relay
HPWS	—	High Pressure Water Switch
JW1	—	Jumper Wire for Alarm
LED	—	Light Emitting Diode
LOC	—	Loss of Charge Pressure Switch
L-WTR	—	Load Water
MS	—	Motor Switch
NEC	—	National Electrical Code
P1	—	Field Wiring Terminal Block
RVS	—	Reversing Valve Solenoid
S-WTR	—	Source Water
TB	—	Terminal Block
TRANS	—	Transformer

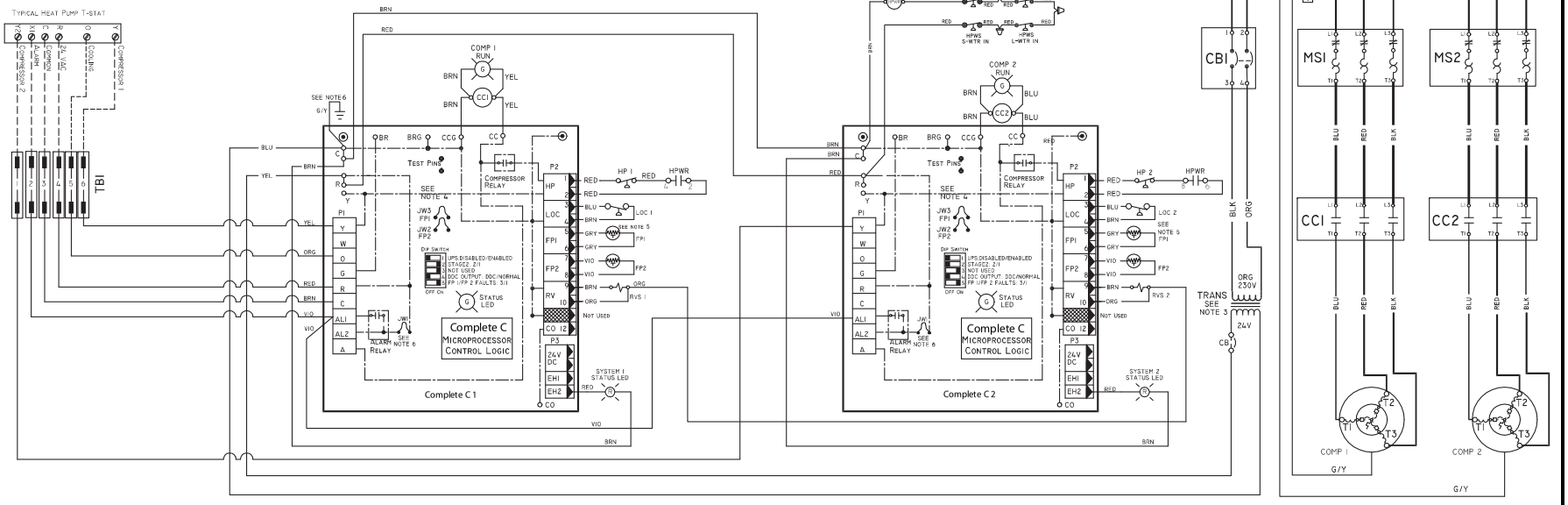
Factory Line Voltage Wiring
Factory Low Voltage Wiring
Field Line Voltage Wiring
Field Low Voltage Wiring
Printed Circuit Trace

Relay/Contactor Coil
Solenoid Coil
Thermistor
Ground
Indicator Light
G=Green, R=Red
(Comp On) (Alarm Light)

Circuit Breaker
High Pressure Switch
Low Pressure Switch
Fuse

NOTES:
1. Compressor thermally protected internally.
2. All wiring to the unit must comply with NEC and local codes.
3. Transformer is wired to 380 v lead (VIO) for 380-3-50 operation. For 420 v operation switch VIO and BRN leads at L1 and insulate VIO lead.
4. FP1 thermistor provides freeze protection for source water. When using antifreeze solutions, cut JW3 jumper.
5. Check installation wiring information for controller hookup. Control wiring must be Class 1 and voltage rating equal to or greater than unit supply voltage.
6. Transformer secondary ground via Complete C board standoff and screws to control box. (Ground available from top 2 standoffs as shown.)
7. Aquastat is supplied with unit and must be wired in series with the hot leg of the pump. Aquastat is rated for voltages up to 277 v.





TYPICAL AQUAZONE™ 50PSW360 DELUXE D CONTROL WIRING, 3-PHASE

LEGEND

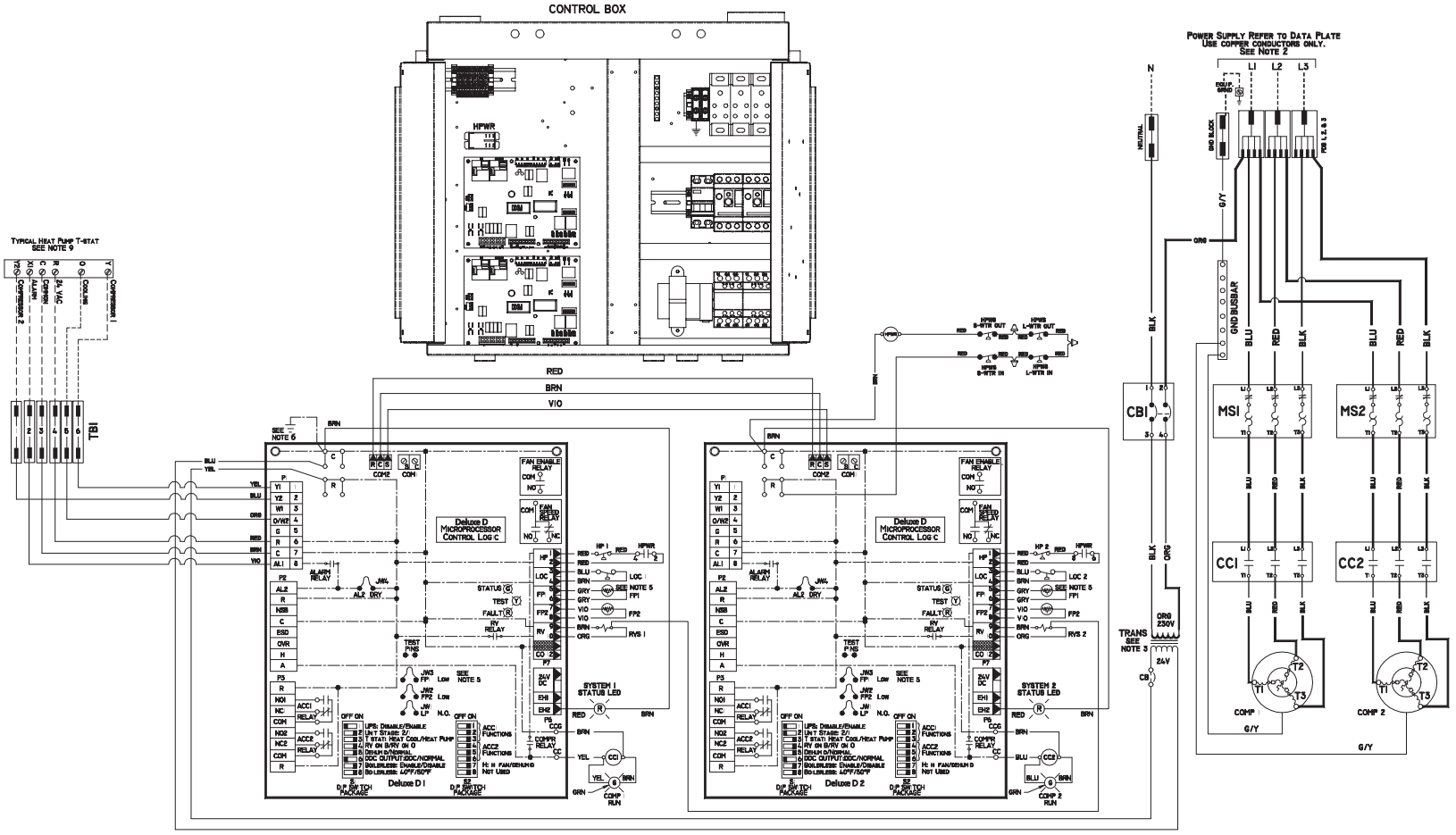
AL	—	Alarm Relay Contacts
COMP	—	Compressor
CC	—	Compressor Contactor
FP1	—	Sensor, Source Low Temp Protection
FP2	—	Sensor, Load Low Temp Protection
HP	—	High Pressure Switch
HPWR	—	High Pressure Water Relay
HPWS	—	High Pressure Water Switch
JW4	—	Jumper Wire for Alarm
LED	—	Light Emitting Diode
LOC	—	Loss of Charge Pressure Switch
L-WTR	—	Load Water
MS	—	Motor Switch
NEC	—	National Electrical Code
P1	—	Field Wiring Terminal Block
RVS	—	Reversing Valve Solenoid
S-WTR	—	Source Water
TB	—	Terminal Block
TRANS	—	Transformer

Factory Line Voltage Wiring
Factory Low Voltage Wiring
Field Line Voltage Wiring
Field Low Voltage Wiring
Printed Circuit Trace

Relay/Contactor Coil
Solenoid Coil
Thermistor
Ground
Indicator Light
G=Green, R=Red
(Comp On) (Alarm Light)

Circuit Breaker
High Pressure Switch
Low Pressure Switch
Fuse

See notes on page 38.



Guide specifications

Commercial Water-to-Water Heat Pump Unit with Puron® Refrigerant (R-410A)

HVAC Guide Specifications

Size Range: **8.6 to 68.2 kW, Nominal**

Carrier Model Number: **50PSW**

Part 1 — General

1.01 SYSTEM DESCRIPTION

A. Heat pump units designed to operate with –5 to 45 C entering water temperature range. Units shall consist of high-efficiency scroll compressors and shall have dual independent refrigeration circuits.

B. Units shall be individually packaged with wooden skid covered with protective corner posts and plastic stretch wrapping for maximum protection.

1.02 QUALITY ASSURANCE

A. Basic unit shall be rated in accordance with ISO/ASHRAE Standards and ETL listed.

B. Units shall have insulation and adhesive which meet NFPA 90A requirements for flame spread and smoke generation, and assembled units shall be ETL listed to UL standard 1995.

C. Units shall be factory tested under normal operating conditions at nominal water flow rates to assure proper operation of all components and safety devices.

D. Units shall have AHRI/ISO and ETL, US and Canada labels.

E. Units shall be CE mark certified.

Part 2 — Product

2.01 EQUIPMENT

A. General:

1. Factory-tested and assembled single-piece water source heat pump units shall be factory wired, charged with HFC-410A, contain refrigerant-to-water heat exchanger, 4-way reversing valve, compressor, metering device, and all internal controls and safety devices.
2. Extended Range:
   a. Unit shall operate at entering water temperature of –5 to 45 C.
   b. Extended range adds closed cell isolation to internal water lines and provides insulation on suction side refrigeration tubing including refrigerant-to-water heat exchangers.

B. Unit Cabinet:

1. Unit shall be constructed of heavy gage, powder-painted, galvanized sheet metal with removable service panels (3).
2. Unit shall have separate entrances for high and low-voltage electrical supplies.
3. Supply and return water connections shall be copper FPT fittings, terminating out the top of the unit to facilitate heading on multiple units side-by-side.
4. All interior surfaces shall be lined with 13 mm thick, 28 kg/m^3 density acoustic type fiberglass insulation. All fiberglass shall be coated and all edges shall be tucked under flanges.

C. Compressors:

Unit shall have heat pump duty, scroll compressors with internal and external isolation.

D. Heat Exchangers:

1. Refrigerant-to-water heat exchanger shall be steel/copper tube-in-tube type rated for coaxial 4306 kPa refrigerant, 3101 kPa water-side pressures. Heat exchanger shall be powder coated for extra protection.
2. Optional steel/cupronickel refrigerant-to-water heat exchanger shall be used for open loop applications, or where water quality cannot be maintained as specified by manufacturer.

E. Refrigerant Components:

1. Refrigeration circuit components shall include liquid line service valve, suction line service valve, reversing valve, a full charge of compressor oil, and a holding charge of refrigerant.
2. Thermostatic expansion valves shall be provided for refrigerant metering. Reversing valve shall be 4-way solenoid activated that defaults to heating.

F. Solid-State Controls:

Two light-emitting diodes (LEDs) shall be externally mounted to indicate compressor ON status and unit fault modes.

G. Controls and Safeties:

1. Safety devices on all units shall include low-pressure sensor, high-pressure switch and low water temperature sensor.
2. Standard Complete C electronic control system(s) shall be a solid-state control system. Units utilizing electro-mechanical control systems shall not be acceptable. The control system microprocessor board shall be specifically designed to protect against building electrical system noise contamination, EMI and RFI interference. The control system shall interface with a heat pump type thermostat. The control system shall have the following features:
   a. Anti-short cycle time delay on compressor operation.
   b. Random start on power-up.
   c. Low voltage protection.
   d. High voltage protection.
   e. Unit shutdown on high or low refrigerant pressures.
   f. Unit shutdown on low water temperature.
   g. Option to reset unit at thermostat or disconnect.
   h. Automatic intelligent reset. Unit shall automatically restart 5 minutes after shutdown if the fault has cleared. Should a fault occur 3 times sequentially, then lockout will occur.
   i. Ability to defeat time delays for servicing.
   j. Light-emitting diode (LED) to indicate high pressure, low pressure, improper voltage, source freeze protection, load freeze

protection, condensate overflow, and control voltage status.

k. The low-pressure switch shall not be monitored for the first 120 seconds after a compressor start command to prevent nuisance safety trips.

l. 24-v output to cycle a motorized water valve with compressor contactor.

m. Unit Performance Sentinel (UPS). The UPS warns when the heat pump is running inefficiently.

n. Source water coil low temperature sensing (selectable for water or antifreeze).

o. Load water coil low temperature sensing.

The Complete C control system also provides the upgraded 75 va control transformer with load side short circuit and overload protection via a built-in circuit breaker.

3. Optional Deluxe D electronic control shall have all the features of the Complete C control, with the following additional features:

a. A removable thermostat connector.

b. Random start on return from night setback.

c. Minimized reversing value operation for extended life and quiet operation.

d. Night setback control from low temperature thermostat, with 2-hour override initiated by a momentary signal from the thermostat.

e. Dry contact night setback output for digital night setback thermostats.

f. Ability to work with heat/cool (Y, W) or heat pump (Y, O) thermostats.

g. Ability to work with heat pump thermostats using O or B reversing valve control.

h. Single grounded wire to initiate night setback or emergency shutdown.

i. Boilerless system control can switch automatically to electric heat at low loop water temperature.

j. Control board shall allow up to 3 units to be operated from one thermostat without any auxiliary controls.

k. A relay to operate an external damper. The control to be such that the damper will not open until 30 minutes after the unit comes back from Unoccupied mode.

l. Fan speed selection at thermostat.

m. A relay to restart a central pump or control a 24-v motorized water valve.

n. Intelligent fan speed selection based upon thermostat demand and/or dehumidistat signal.

This option also provides the upgraded 75 va control transformer with load side short circuit and overload protection via a built-in circuit breaker.

4. LonWorks Interface System:

Units shall have all features of chosen control panel (either Complete C or Deluxe D) and the control board shall be supplied with a LonWorks interface board, which is LONMark certified. This will permit all units to be daisy chained via a 2-wire twisted pair shielded cable. The following points must be available at a central or remote computer location:

a. source leaving water temperature.

b. load leaving water temperature.

c. command of space temperature set point.

d. cooling status.

e. heating status.

f. low temperature sensor alarm.

g. low pressure sensor alarm.

h. high pressure switch alarm.

i. condensate sensor alarm.

j. high/low voltage alarm

k. unoccupied/occupied command.

l. cooling command.

m. heating command.

n. fault reset command.

o. itemized fault code revealing reason for specific shutdown fault (any one of 7).

This option also provides the upgraded 75 va control transformer with load side short circuit and overload protection via a built-in circuit breaker.

H. Electrical:

1. A control box shall be located within the unit compressor compartment and shall contain a 75 va transformer, 24 volt activated, 2 or 3 pole compressor contactor, terminal block for thermostat wiring and solid-state controller for complete unit operation. Electro-mechanical operation WILL NOT be accepted.

2. Units shall be name-plated for use with time-delay fuses or HACR circuit breakers.

3. Unit controls shall be 24 volt and provide heating or cooling as required by the remote thermostat.

I. Special Features:

1. Optional sound attenuation (mute) package consists of attenuation material applied to unit base pan and removable panels plus refrigerant muffler. Unit sizes 180 and 360 include sound blanket on both compressors to reduce noise.

2. Thermostat Controls:

Accessory thermostat controls include:

a. Programmable, multi-stage thermostat with 7-day clock, holiday scheduling, large backlit display and remote sensor capability.

b. Programmable 7-day light-activated thermostat offers occupied comfort settings with lights on, unoccupied energy savings with lights off.

c. Programmable 7-day flush-mount thermostat offers locking cover plate with tamper proof screws, flush to wall mount, dual point with adjustable deadband, O or B terminal, and optional remote sensor.

d. Programmable 5-day thermostat offers 2-stage heat, 2-stage cool, auto changeover, 5-minute built-in compressor protection, locking cover included.

e. Non-programmable thermostat with 2 heat stages, 2 cool stages, auto changeover, 5-minute built-in compressor protection, locking cover included.

3. Fire-rated hose kits come with a fixed MPT on one end and a swivel with an adapter on the other end. Hose kits can be either stainless steel or galvanized.
4. Ball valves (brass body) are for shutoff and balancing water flow. Valves are available with memory, memory stop, and pressure temperature ports.
5. Y Strainers (bronze body) are "Y" type configuration with a brass cap and a stainless steel strainer screen. Maximum operating pressure rating of strainers is 3103 kPa.
6. Solenoid valves (brass body) provide slow operation for quiet system application.
7. Hose kit assemblies include a ported ball valve with pressure temperature (P/T) plug ports, flexible stainless steel hose with swivel and nipple. Return hose includes a ball valve, preset measure flow (gpm) with two P/T ports, flexible stainless steel hose with a swivel and nipple.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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